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U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*

OFFICE OF TECHNICAL SERVICES
John C. Green, *Director*

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LINEAL INCLINATION IN ENCODING INFORMATION SYMBOLICALLY ON CATHODE RAY TUBES AND SIMILAR DISPLAYS. AN EQUAL-DISCRIMINABILITY SCALE OF LINEAL INCLINATION WAS CONSTRUCTED AND VALIDATED. EFFECTS OF USING DIFFERENT READOUT SYSTEMS AND EFFECTS OF DISPLAYING THE SYMBOLS IN DIFFERENT VISUAL SURROUNDS.
AD-278 825 DIV. 28

*COLORS

COLOR CONVERSION FILTERS FOR ELECTROLUMINESCENT LIGHT, APPLIED WHERE LOW-LEVEL, NONCATASTROPHIC LIGHTING IS REQUIRED SUCH AS WITH INDICATORS, READOUTS, OR DISPLAYS.
AD-278 747 DIV. 25

*COMBINATORIAL ANALYSIS

A COMBINATORIAL METHOD FOR PRODUCTS OF TWO MULTIPLE K-STATISTICS.
AD-278 553 DIV. 15

*COMBUSTION

AN IMPROVED METHOD FOR THE MEASUREMENT OF FLAME CONDUCTIVITY IS DESCRIBED. A COMPARATIVE STUDY WAS MADE BETWEEN THE ION CONCENTRATION AND THE DIFFERENT BAND SPECTRA INTENSITY EMITTED IN THE SAME FLAMES. A CORRELATION WAS ESTABLISHED BETWEEN THE OH EMISSION AND ION CONCENTRATION.
AD-278 417 DIV. 25

*ANTENNA HORNS

THEORETICAL STUDIES ON TRIANGULAR APERTURE HORN ANTENNAS (TAHA) AND SURFACE WAVE LAUNCHERS.
AD-278 731 DIV. 8

*ANTENNA RADIATION PATTERNS

NEAR FIELD MEASUREMENTS ON A LOGARITHMICALLY PERIODIC ANTENNA.
AD-278 588 DIV. 8

THEORETICAL STUDIES ON TRIANGULAR APERTURE HORN ANTENNAS (TAHA) AND SURFACE WAVE LAUNCHERS.
AD-278 731 DIV. 8

*ANTENNAS

NEAR FIELD MEASUREMENTS ON A LOGARITHMICALLY PERIODIC ANTENNA.
AD-278 588 DIV. 8

THEORETICAL STUDIES ON TRIANGULAR APERTURE HORN ANTENNAS (TAHA) AND SURFACE WAVE LAUNCHERS.
AD-278 731 DIV. 8

*ANTENNAS
FOCUSING

ANTENNA FOCUSING SYSTEM STUDY: TABLES OF RALEIGH PROBABILITY DISTRIBUTION.
AD-278 491 DIV. 8

*ANTIAIRCRAFT DEFENSE SYSTEMS

APPLICATION OF NEW SENSOR AND DATA PROCESSING TECHNIQUES FOR RECOGNITION OF NON-COOPERATIVE AEROSPACE VEHICLES: SENSORS CHOSEN ARE GROUND BASED RF SIGNAL INTERCEPTOR AND IR-VISUAL APPEARANCE-BEHAVIOR SENSOR.
AD-278 566 DIV. 12

APPLICATION OF RECOGNITION THEORY TO MISSILE IDENTIFICATION AND DECOY DISCRIMINATION: VOLUME 2. THEORETICAL AND COMPUTATIONAL ASPECTS OF THE MAIN PROBLEM.
AD-278 687 DIV. 12

*APTITUDE TESTS
RELIABILITY

STABILITY OF AIR FORCE TEST SCORES WERE EXAMINED. STABILITY COEFFICIENTS FOR THE INDIVIDUAL TESTS WERE LOWER THAN THEIR RELIABILITIES: BUT THE ONLY APPRECIABLE DIFFERENCES WERE FOR BIOGRAPHICAL DATA SCORES: FIGURE RECOGNITION: AND CLERICAL MATCHING.
AD-278 669 DIV. 28

*ARGON

LITERATURE DEALING WITH HIGH-TEMPERATURE THERMODYNAMIC PROPERTIES FOR AIR, N2, O2, A, AND HE (COMPUTED THEORETICALLY FROM STATISTICAL THERMODYNAMICS) IS REVIEWED.
AD-278 589 DIV. 25

*ASTROPHYSICS

RESULTS OF RESEARCH IN LABORATORY ASTROPHYSICS ON THE MOLECULAR EXCITATION GROUP AT THE UNIVERSITY OF WESTERN ONTARIO ARE REVIEWED.
AD-278 511 DIV. 25

*ATOMIC ORBITALS

THE STABILITY OF HARTREE-FOCK STATES.
AD-278 504 DIV. 15

*ATOMIC STRUCTURE

THE THOMSON AND DIRICHLET PRINCIPLES OF ELECTROSTATICS WERE APPLIED TO THE EVALUATION OF ELECTRON INTERACTION TERMS OCCURRING IN MOLECULAR ENERGY CALCULATIONS.
AD-278 445 DIV. 25

*AURORAE

A SUMMARY AND DISCUSSION IS PRESENTED OF A FEW SELECTED FEATURES OF THE GEOMAGNETIC FIELD IN SPACE, AND SOME ATTRIBUTES OF THE ENERGETIC AND OTHER CHARGED PARTICLES TRAPPED OR GUIDED BY THIS FIELD. SPECIAL ATTENTION IS GIVEN TO AURORAL PARTICLES.
AD-278 475 DIV. 2

*AUTOMATION

THE DEVELOPMENT OF A CONDITIONED-REFLEX SYSTEM FOR USE IN AUTOMATIC ECM MODE SELECTION IS DISCUSSED.
AD-278 494 DIV. 30

THE EFFECTS OF FORMATTING RESTRICTIONS ON THE QUALITY OF REPORT SUMMARIES PRODUCED BY HUMANS.
AD-278 663 DIV. 32

*AVIATION ACCIDENTS

THE LOAD FACTOR (G FORCE) EXERTED ON THE PILOT DURING ANY LONGITUDINAL MANEUVER MUST BE RESTRICTED TO THE PHYSIOLOGICAL TOLERANCE OF THE PILOT. RESTRICTIVE TOLERANCES OF BOTH NEGATIVE AND POSITIVE G-FORCES WHICH IMPOSE ON LOW-LEVEL, HIGH-SPEED FLIGHT WERE INVESTIGATED.
AD-278 653 DIV. 16

*AXIALLY SYMMETRIC FLOW

FLOW NEAR THE RIM OF THE FLAT BASE OF A BODY OF REVOLUTION IS STUDIED TO ESTABLISH THE EFFECT WHICH AXIAL SYMMETRY HAS ON THE EXPANSION PROCESS
AD-278 485 DIV. 9

*BACTERIA
GROWTH

EFFECTS OF TEMPERATURE ON OXYGEN CONSUMPTION AND GENERATION TIMES OF KLEBSIELLA PNEUMONIAE AND STAPHYLOCOCCUS AUREUS SHOWED THAT THE GENERATION TIMES APPEARED TO BE INDEPENDENT OF TEMPERATURE BETWEEN 25 AND 37 C. THEY WERE TEMPERATURE DEPENDENT BELOW 25 C.
AD-278 528 DIV. 16

*BAND-PASS FILTERS

HIGH-POWER FILTER TECHNIQUES TO SUPPRESS THE RADIATION OF SPURIOUS FREQUENCIES FROM HIGH-POWER SOURCES.
AD-278 719 DIV. 8

*BAND-PASS FILTERS
RADIO TRANSMITTERS

PERFORMANCE OF 2 HIGH POWER, NARROW-BAND-PASS, TRANSMITTER-OUTPUT FILTERS, ARE CENTERED AT 10 MC AND THE OTHER AT 300 MC! INSERTION LOSS IN THE STOP BANDS.
AD-278 715 DIV. 8

*BEAMS

A METHOD OF EXPRESSING TWO-DIMENSIONAL THERMAL STRESSES IN A BEAM IN A SERIES INVOLVING THE DERIVATIVES OF THE TEMPERATURE IS DISCUSSED. A SIMPLE ALGEBRAIC METHOD OF OBTAINING THE TERMS IN THE SERIES FOR BOTH LOAD AND TEMPERATURE IS GIVEN.
AD-278 461 DIV. 25

*BERYLLIUM

BE SHEET COMPOSITE STRUCTURES FOR AEROSPACE VEHICLE APPLICATIONS.
AD-278 526 DIV. 17

REVIEW OF UNCLASSIFIED LITERATURE (1958-1960) ON BERYLLIUM FOR STRUCTURAL APPLICATIONS. PHYSICAL AND PROCESS METALLURGY.
AD-278 723 DIV. 17

*BERYLLIUM ALLOYS

REVIEW OF UNCLASSIFIED LITERATURE (1958-1960) ON BERYLLIUM FOR STRUCTURAL APPLICATIONS. PHYSICAL AND PROCESS METALLURGY.
AD-278 723 DIV. 17

*BERYLLIUM COMPOUNDS

SUBSTITUTION-ADDITION REACTIONS OF EXCESS BERYLLIUM(II) AND CHROMIUM(III) ACETYLACETONATES WITH DIPHENYLPHOSPHINIC ACID CARRIED OUT IN MELTS YIELD THE DIMERS, (BE(C5H702)(OP(C6H5)2O))2 AND (CR(C5H702)2(OP(C6H5)2O))2. THE DIPHENYLPHOSPHINATE ANION ACTS AS A CATENATING GROUP: CYCLIC OLIGOMERS FORMED IN PREFERENCE TO LINEAR POLYMERS.
AD-278 462 DIV. 4

PROCESSING VARIABLES AND FABRICATION TECHNIQUES TO BE USED IN THE PRODUCTION OF HARDWARE STRUCTURES MADE OF NIOBIUM BERYLLIDES ARE DISCUSSED. INTERMETALLIC COMPOUNDS OF NBBE12, NB2BE17, NB29E19, AND TA2BE17 WERE FABRICATED. SINTERING STUDIES WERE MADE OF NB2BE17.
AD-278 807 DIV. 17

*BIBLIOGRAPHY

LITERATURE DEALING WITH HIGH-TEMPERATURE THERMODYNAMIC PROPERTIES FOR AIR, N2, O2, A, AND HE (COMPUTED THEORETICALLY FROM STATISTICAL THERMODYNAMICS) IS REVIEWED.
AD-278 589 DIV. 25

BIBLIOGRAPHY ON SNOW, ICE, AND PERMAFROST WITH ABSTRACTS.
AD-278 593 DIV. 2

*BIBLIOGRAPHY
BERYLLIUM

REVIEW OF UNCLASSIFIED LITERATURE (1958-1960) ON BERYLLIUM FOR STRUCTURAL APPLICATIONS. PHYSICAL AND PROCESS METALLURGY.
AD-278 723 DIV. 17

*BIBLIOGRAPHY
GAMES THEORY

SELECTED REFERENCES FROM UTILITY THEORY AND MILITARY ESSENTIALITY FOR THE STUDY OF MILITARY ESSENTIALITY MEASURES. LINEAR EXPECTED UTILITY, GROUP UTILITIES, EXPERIMENTAL WORK, DERIVATION OF MILITARY WORTH MEASURES, APPLICATION IN DECISION PROBLEMS, AND GENERAL MILITARY DECISION PROBLEMS.
AD-278 664 DIV. 15

*BIBLIOGRAPHY
JOB ANALYSIS

A BIBLIOGRAPHY OF JOB ANALYSIS LISTING 1500 TITLES. 1911-1961.
AD-278 708 DIV. 23

*BIBLIOGRAPHY
PRINTED CIRCUITS

AN ANNOTATED BIBLIOGRAPHY OF PRINTED CIRCUITS AND WELDED MODULES. MICROMINIATURIZATION OF CIRCUITS AND COMPONENTS FROM A MANUFACTURING RESEARCH VIEWPOINT. DESIGN STANDARDS AND PROCEDURES, PRODUCTION METHODS AND TECHNIQUES, AND APPLICATIONS. CONTINUATION OF AD-271 035, TO END OF 1961.
AD-278 631 DIV. 8

*BIBLIOGRAPHY
RADIATION EFFECTS

AN ANNOTATED BIBLIOGRAPHY OF RADIATION EFFECTS ON COAXIAL CABLES AND ELECTRIC INSULATION MATERIALS TO FEBRUARY 1962.
AD-278 674 DIV. 20

*BIBLIOGRAPHY
RADIO INTERFERENCE

AN ANNOTATED BIBLIOGRAPHY OF R-F BLACKOUT PHENOMENA, THEORETICAL AND EXPERIMENTAL STUDIES OF CAUSES AND POSSIBLE SOLUTIONS TO THE PROBLEM, 1959 - FEBRUARY 1962.
AD-278 678 DIV. 8

*BINDERS

A BINDER HAVING THE COMPOSITION IN THE SYSTEM NA2O-XRO2-(3-X)SIO2 (RO2 BEING ZRO2 AND TIO2) WAS DEVELOPED FOR GRAIN-ORIENTED SI STEEL WOULD CUT C-TYPE CORES FOR OPERATION WITHIN -55 TO 600 C. THE BINDER DID NOT DEGRADE THE MAGNETIC PROPERTIES OF THE CORE.
AD-278 734 DIV. 7

*BLOOD VOLUME

RUBBER TUBE AS INSULATION IMPROVED THE TIME COURSE COMPENSATION WITH ABRUPT TEMPERATURE CHANGES WHEN USED IN THE MEASUREMENT OF THE PERIPHERAL BLOOD FLOW IN DIGITAL PLETHYSMOGRAPHY.
AD-278 523 DIV. 16

*BODIES OF REVOLUTION

FLOW NEAR THE RIM OF THE FLAT BASE OF A BODY OF REVOLUTION IS STUDIED TO ESTABLISH THE EFFECT WHICH AXIAL SYMMETRY HAS ON THE EXPANSION PROCESS.
AD-278 485 DIV. 9

THE EXACT AND LINEARIZED DIPOLE DISTRIBUTIONS GENERATING LENTICULAR CYLINDERS IN AN INFINITE FLUID ARE COMPARED FOR VARIOUS VALUES OF A FULLNESS PARAMETER.
AD-278 726 DIV. 9

THE MULTIPLE SCATTERING OF PLANE WAVES BY TWO IDENTICAL INFINITE, WIDELY SPACED, PARALLEL ELLIPTIC CYLINDERS IS TREATED. THE MAJOR AXES ARE CONSIDERED AS PARALLEL AND THE MINOR AXES CO-LINEAR AND VICE-VERSA.
AD-278 745 DIV. 8

*BODIES OF REVOLUTION
STABILIZATION

THEORETICAL AND EXPERIMENTAL DATA ARE COMBINED TO PROVIDE AN EASY METHOD OF ESTIMATING THE STATIC AND DYNAMIC STABILITY OF CYLINDRICAL BODIES WITH TANGENT OGIVES NOSE SHAPES IN COMBINATION WITH LOW ASPECT RATIO CRUCIFORM FINS.
AD-278 423 DIV. 9

*BODY TEMPERATURE

TOTAL BODY HEATING PRIOR TO COLD EXPOSURE IS AN INEFFECTIVE MEANS OF EXTENDING MAN'S TOLERANCE TO EXTREME COLD AND COULD RESULT IN A DIMINUTION OF TOLERANCE.
AD-278 522 DIV. 16

RUBBER TUBE AS INSULATION IMPROVED THE TIME COURSE COMPENSATION WITH ABRUPT TEMPERATURE CHANGES WHEN USED IN THE MEASUREMENT OF THE PERIPHERAL BLOOD FLOW IN DIGITAL PLETHYSMOGRAPHY.
AD-278 523 DIV. 16

*BODY TEMPERATURE
MEASUREMENT

DETERMINATION OF THE HYPOTHERMIC OR HYPERTHERMIC EFFECT OF CHLORPROMAZINE ON THE BODY TEMPERATURE. THE CRITICAL AMBIENT TEMPERATURE WAS CALCULATED TO BE 33 C USING 2 MILLIGRAMS/KG OF CHLORPROMAZINE IN MICE. OTHER FACTORS OF

***DIFFERENTIAL EQUATIONS**

THE WHITTAKER-HILL EQUATION AND THE WAVE EQUATION IN PARABOLOIDAL COORDINATES.
AD-278 740 DIV. 15

A BOUNDARY LAYER THEORY FOR UNSYMMETRIC DEFORMATIONS OF CIRCULAR CYLINDRICAL ELASTIC SHELLS.
AD-278 744 DIV. 25

***DIFFRACTION**

THE MULTIPLE SCATTERING OF PLANE WAVES BY TWO IDENTICAL INFINITE, WIDELY SPACED, PARALLEL ELLIPTIC CYLINDERS IS TREATED. THE MAJOR AXES ARE CONSIDERED AS PARALLEL AND THE MINOR AXES CO-LINEAR AND VICE-VERSA.
AD-278 745 DIV. 8

***DIGITAL COMPUTERS**

THE DEVELOPMENT OF A CONDITIONED-REFLEX SYSTEM FOR USE IN AUTOMATIC ECM MODE SELECTION IS DISCUSSED.
AD-278 494 DIV. 30

A VARIABLE INFORMATION PROCESSING SYSTEM (VIP) FOR THE STORAGE AND RETRIEVAL OF MISSILE DATA IS DESCRIBED.
AD-278 835 DIV. 30

CIRCUIT TECHNIQUES AND MEMORY DEVICES FOR IMPLEMENTING A SUBMICROSECOND SIMULATION COMPUTER ARE DISCUSSED.
AD-278 848 DIV. 30

***DIODES**

SILICON, GROWN-JUNCTION, DIFFUSED-BASE TRANSISTORS EXHIBITING AN ABNORMALLY HIGH INPUT IMPEDANCE IN THE COMMON COLLECTOR OR EMITTER-FOLLOWER-AMPLIFIER CIRCUIT. TRANSISTORS DISTINGUISHED BY NOTCHES IN EMITTER, AND COLLECTOR DIODES AND CURRENT GAIN AT VERY LOW FREQUENCIES.
AD-278 637 DIV. 8

TUNNEL EMISSION AMPLIFIER INVESTIGATION. DIODE AND TRIODE STRUCTURES OF VARIOUS MATERIALS WERE PREPARED AND TESTED.
AD-278 655 DIV. 8

MICROWAVE ENERGY CONVERSION TO DIRECT CURRENT BY HIGH-FREQUENCY SEMICONDUCTOR DIODES.
AD-278 703 DIV. 8

***DIPOLE ANTENNAS**

THE COMPENSATION THEOREM IS APPLIED TO THE PROBLEM OF THE SKY-WAVE FIELD FROM A VERTICAL, ELECTRIC DIPOLE PLACED ON AN INHOMOGENEOUS, FLAT EARTH CONSISTING OF TWO MEDIA, ONE PERFECTLY CONDUCTING AND ONE HAVING A FINITE CONDUCTIVITY.
AD-278 500 DIV. 8

LOOPS AND DIPOLES AS ELECTROMAGNETIC FIELD MEASURING SENSORS; STABILITY FOR NEAR FIELD MEASUREMENTS; INTERACTION ERRORS; POWER DENSITY MEASUREMENTS IN THE NEAR FIELD.
AD-278 692 DIV. 8

***DIRECTION FINDING**
MICROWAVE EQUIPMENT

DESIGN, FABRICATION, AND TESTING OF THE AN/TLA-9, DIRECTION FINDER GROUP WHICH IS A RAPID SCAN MICROWAVE OF SYSTEM FOR INTERCEPTION AND AZIMUTH BEARING FINDING OF SIGNALS FROM 1 TO 10.75 KMC.
AD-278 679 DIV. 6

***DISASTERS**
FLOODS

ANALYSIS OF STRUCTURAL DAMAGE FROM THE 1960 TSUNAMI AT HILO, HAWAII.
AD-278 730 DIV. 2

***DISPERSION HARDENING**

STUDY OF MECHANISM BY WHICH SECOND-PHASE PARTICLES STRENGTHEN ALLOYS. HARDENING IN AGE HARDENED NI-AL AND CU-CO ALLOYS. DIRECT OBSERVATION OF COHERENCY STRAINS IN A CU-CO ALLOY. EFFECT OF PRECIPITATED PARTICLES ON DEFORMATION AND RECOVERY IN NI-AL ALLOY.
AD-278 560 DIV. 25

***DISPLAY SYSTEMS**

A METHOD OF DEMONSTRATING THE UTILITY OF QUICKENING WITH RESPECT TO A SYNTHESIZED HYPOTHETICAL THIRD-ORDER CONTROL SYSTEM. THE SYSTEM DYNAMICS AND THE QUICKENING ARE SIMULATED THROUGH THE USE OF ANALOG COMPUTER EQUIPMENT.
AD-278 698 DIV. 30

LINEAL INCLINATION IN ENCODING INFORMATION SYMBOLICALLY ON CATHODE RAY TUBES AND SIMILAR DISPLAYS. AN EQUAL-DISCRIMINABILITY SCALE OF LINEAL INCLINATION WAS CONSTRUCTED AND VALIDATED. EFFECTS OF USING DIFFERENT READOUT SYSTEMS AND EFFECTS OF DISPLAYING THE SYMBOLS IN DIFFERENT VISUAL SURROUNDS.
AD-278 825 DIV. 28

***DISPLAY SYSTEMS**
LIGHTING EQUIPMENT

COLOR CONVERSION FILTERS FOR ELECTROLUMINESCENT LIGHT. APPLIED WHERE LOW-LEVEL, NONCATASTROPHIC LIGHTING IS REQUIRED SUCH AS WITH INDICATORS, READOUTS, OR DISPLAYS.
AD-278 747 DIV. 25

***DISSOCIATION**

THERMODYNAMIC THEORY PERMITS PREDICTION OF THE MODE OF VAPORIZATION OF TRANSITION ELEMENT SULPHIDES. MNS IS THE ONLY CLEAR CASE WHERE A GASEOUS SULPHIDE MOLECULE HAS APPRECIABLE CONCENTRATION IN SATURATED VAPOR. THIS WAS CONFIRMED BY MASS SPECTROSCOPY WHICH GAVE THE DISSOCIATION ENERGY VALUE 65 5 KCAL/MOLE.
AD-278 829 DIV. 25

TWO CORRELATIONS HAVE BEEN PROPOSED. THE FIRST RELATES THE DISSOCIATION ENERGY OF HOMONUCLEAR DIATOMIC MOLECULES TO THE LATTICE ENERGY OF THE CORRESPONDING ELEMENTS. THE SECOND RELATES THE LATTICE ENERGY TO THE PROMOTIONAL ENERGY OF A CONFIGURATION COMPOSED OF LOW-LYING EXCITED LEVELS OF THE ATOM.
AD-278 830 DIV. 25

***DOCUMENTATION**

THE OPERATION OF THE SOVIET ALL-UNION INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL INFORMATION IS DESCRIBED.
AD-278 503 DIV. 32

***DOCUMENTATION**
THEORY

EFFORT WAS DIRECTED TOWARD THE DEVELOPMENT OF A GENERAL THEORY OF DOCUMENTATION WHICH WILL ENABLE MATHEMATICAL ANALYSIS OF THE BASIC PRINCIPLES UNDERLYING TECHNIQUES OF INFORMATION RETRIEVAL.
AD-278 551 DIV. 32

***DOPPLER SYSTEMS**

THE ESTIMATION OF THE DOPPLER SHIFT, FREQUENCY SCALE FACTOR AND AMPLITUDE OF THE SPECTRUM OF A STATIONARY GAUSSIAN RANDOM PROCESS FROM A RECORD OF LIMITED DURATION IS CONSIDERED.
AD-278 686 DIV. 25

***DRAG**

A STEADY, INCOMPRESSIBLE, ELECTRICALLY CONDUCTING, LAMINAR BOUNDARY LAYER OVER A SEMI-INFINITE FLAT PLATE IS TREATED.
AD-278 694 DIV. 9

***DRUGS**
HEAT TOLERANCE

THE INFLUENCE OF PHYSICAL CHARACTERISTICS, PSYCHOLOGICAL FACTORS, AND DRUGS ON THE CAPACITY OF MAN TO WORK IN THE HEAT.
AD-278 697 DIV. 16

***DYSPROSIUM**

ER-172 AND DY-166 WITH HALF-LIVES OF 48.7 PLUS OR MINUS 0.5 HOURS AND 81.3 PLUS OR MINUS 0.2 HOURS WERE PRODUCED BY DOUBLE NEUTRON CAPTURE FORM ER-170 AND DY-164.
AD-278 597 DIV. 20

***EARTH**

THE INFLUENCE OF THE EARTH'S CORE UPON THE RATE OF THE EARTH'S ROTATION.
AD-278 476 DIV. 2

***EARTHQUAKES**

RELATIONSHIP BETWEEN TECTONIC ACTIVITY AND SOLAR ACTIVITY.
AD-278 629 DIV. 2

***ECHO RANGING**

STUDIES ON THE DISTRIBUTION OF RADIO ECHOES FROM METEOR TRAILS.
AD-278 813 DIV. 2

***ECOLOGY**

ECOLOGICAL AND SEASONAL VARIATIONS INFLUENCE THE CALORIC INTAKE AND ARE FUNDAMENTAL FEATURES OF AN IMPROVED COLD RESISTANCE OR ACCLIMATIZATION. IMPROVED INSULATION EXTENDS THE RANGE OVER WHICH AN ANIMAL IS ABLE TO MAINTAIN THERMAL BALANCE.
AD-278 527 DIV. 16

***EFFECTIVENESS**

THE EFFECTS OF FORMATTING RESTRICTIONS ON THE QUALITY OF REPORT SUMMARIES PRODUCED BY HUMANS.
AD-278 663 DIV. 32

***EJECTION SEATS**

DEVELOPMENT AND QUALIFICATION TESTS ON CARTRIDGE ACTUATED THRUSTER, T26, A COLUMN STOWAGE THRUSTER FOR THE B52 ESCAPE SYSTEM. A MODIFICATION OF THE M3A1 CARTRIDGE ACTUATED THRUSTER. THE NEW DESIGN INCORPORATES WEIGHT REDUCTION AND IMPROVED PERFORMANCE.
AD-278 556 DIV. 22

***EJECTOR CARTRIDGES**

DEVELOPMENT AND QUALIFICATION TESTS ON CARTRIDGE ACTUATED THRUSTER, T26, A COLUMN STOWAGE THRUSTER FOR THE B52 ESCAPE SYSTEM. A MODIFICATION OF THE M3A1 CARTRIDGE ACTUATED THRUSTER. THE NEW DESIGN INCORPORATES WEIGHT REDUCTION AND IMPROVED PERFORMANCE.
AD-278 556 DIV. 22

***ELASTIC SCATTERING**

MICROWAVE INTERFEROMETRY IS ADOPTED TO MEASURE THE EFFECTIVE COLLISION CROSS SECTION FOR MOMENTUM TRANSFER OF THERMAL ELECTRONS WITH CESIUM ATOMS IN THE AFTERGLOW OF PURE CESIUM AND HELIUM-CESIUM DISCHARGES.
AD-278 563 DIV. 25

***ELASTICITY**

THE SETTLEMENTS AND TILTING OF FOOTINGS ON COMPACTED SNOW AND CERTAIN FROZEN GROUNDS ARE TREATED. SUCH FOUNDATIONS SHOW LARGE CREEP DEFORMATIONS WHEN SUBJECTED TO LOADS OF LONG DURATION.
AD-278 533 DIV. 25

DISCUSSES THE MAXIMIZING THE RECOVERABLE ENERGY BY SUBJECTING A LINEAR VISCOELASTIC SOLID TO A GIVEN DEFORMATION HISTORY.
AD-278 543 DIV. 25

ASYMMETRIC RELAXATION AND COMPLIANCE MATRICES IN LINEAR VISCOELASTICITY.
AD-278 544 DIV. 25

THE STRESSES INDUCED BY A PERFORATION IN AN OTHERWISE UNIFORMLY STRESSED PLATE OF ARBITRARY FINITE THICKNESS ARE ANALYZED.
AD-278 645 DIV. 25

THE STRESS AND VELOCITY FIELD OF AN ENERGY SOURCE MOVING IN AN ELASTIC SOLID WITH A FREE SURFACE AT CONSTANT VELOCITY.
AD-278 738 DIV. 25

PRACTICAL METHODS OF VISCOELASTIC STRESS ANALYSIS AND MECHANICAL MODEL FITTING ARE SUMMARIZED.
AD-278 809 DIV. 25

***ELASTOMERS**

REACTOR RADIATION EFFECTS ON THE ENGINEERING PROPERTIES OF ELASTOMERS AND PLASTICS AT VARIOUS TEMPERATURES IN SEVERAL MEDIA, INCLUDING AIR, HELIUM JP6 FUEL, ORONITE, MIL 7808, AND MIXED APJE.
AD-278 818 DIV. 20

***ELECTRIC ARCS**

ELECTRICAL BREAKDOWN IN HIGH VACUUM.
AD-278 564 DIV. 25

ENERGY TRANSFER ON A NON-ABLATING METAL ANODE OF A HIGH-INTENSITY ARGON ARC. ENERGY BALANCE OF A TRANSPIRATION-COOLED POROUS CARBON ANODE OF A HIGH-INTENSITY ARGON ARC.
AD-278 570 DIV. 25

***ELECTRIC DISCHARGES**

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

ELECTRICAL BREAKDOWN IN HIGH VACUUM.
AD-278 564 DIV. 25

HIGH FREQUENCY GASEOUS BREAKDOWN UNDER CONDITIONS OF NON-UNIFORM ELECTRIC FIELDS; BREAKDOWN FIELDS MEASURED IN THREE RESONANT CAVITIES AT X BAND; CALCULATION OF EFFECTIVE DIFFUSION LENGTHS FOR THE NON-UNIFORM FIELD CAVITIES.
AD-278 568 DIV. 25

***ELECTRIC IGNITERS**

A MODIFIED FORM OF THE BINOMIAL PROBABILITY THEOREM IS USED TO DERIVE THE RELATIONSHIPS OF SERIES AND PARALLEL ARRANGEMENTS OF ELECTRICALLY INITIATED EXPLOSIVES.
AD-278 832 DIV. 22

*COMBUSTION INHIBITION

SYNTHESIS OF DIPHENYLPHOSPHINODECABORANE FROM THE REACTION OF DECABORANYL SODIUM AND DIPHENYLPHOSPHINODECABORANE. CHEMICAL REACTIONS WITH LEWIS ACIDS, ALCOHOLS, AND AMINES.
AD-278 702 DIV. 10

*COMPLEX COMPOUNDS

SUBSTITUTION-ADDITION REACTIONS OF EXCESS BERYLLIUM(II) AND CHROMIUM(III) ACETYLACETONATES WITH DIPHENYLPHOSPHINIC ACID CARRIED OUT IN MELTS YIELD THE DIMERS: (BE(C5H702)(OP(C6H5)20))2 AND (CR(C5H702)2(OP(C6H5)20)2)2. THE DIPHENYLPHOSPHINATE ANION ACTS AS A CATENATING GROUP; CYCLIC OLIGOMERS FORMED IN PREFERENCE TO LINEAR POLYMERS.
AD-278 462 DIV. 4

*COMPOSITE MATERIALS

BE SHEET COMPOSITE STRUCTURES FOR AEROSPACE VEHICLE APPLICATIONS.
AD-278 926 DIV. 17

A BINDER HAVING THE COMPOSITION IN THE SYSTEM NA2O-XRO2-(3-X)SIO2 (RO2 BEING ZRO2 AND TIO2) WAS DEVELOPED FOR GRAIN-ORIENTED SI STEEL WOUND CUT C-TYPE CORES FOR OPERATION WITHIN -55 TO 600 C. THE BINDER DID NOT DEGRADE THE MAGNETIC PROPERTIES OF THE CORE.
AD-278 734 DIV. 7

*COMPUTER LOGIC

CIRCUIT TECHNIQUES AND MEMORY DEVICES FOR IMPLEMENTING A SUBMICROSECOND SIMULATION COMPUTER ARE DISCUSSED.
AD-278 848 DIV. 30

*CONDENSATION TRAILS

FLOW NEAR THE RIM OF THE FLAT BASE OF A BODY OF REVOLUTION IS STUDIED TO ESTABLISH THE EFFECT WHICH AXIAL SYMMETRY HAS ON THE EXPANSION PROCESS
AD-278 485 DIV. 9

*CONFERENCES

LECTURES ON FAILURE ANALYSIS, CAUSES, CURES, AND PREVENTIVE MEASURES OF CORROSION, STATIC AND DYNAMIC LOADING, THERMAL CYCLING, CORROSION, AND INERT ENVIRONMENTS, BASIC PRINCIPLES OF LUBRICATION AND LUBRICATION TECHNIQUES.
AD-278 803 DIV. 17

*CONICAL BODIES STABILIZATION

THEORETICAL AND EXPERIMENTAL DATA ARE COMBINED TO PROVIDE AN EASY METHOD OF ESTIMATING THE STATIC AND DYNAMIC STABILITY OF CYLINDRICAL BODIES WITH TANGENT OGIVES NOSE SHAPES IN COMBINATION WITH LOW ASPECT RATIO CRUCIFORM FINS.
AD-278 423 DIV. 9

*CONTAINERS CORROSION

THE EFFECT OF MOLTEN ALKALI METALS ON CONTAINMENT METALS AND ALLOYS AT HIGH TEMPERATURES.
AD-278 654 DIV. 17

*CONTAINERS DESIGN

AN ANALYSIS IS REPORTED OF THE LOADING CONFIGURATIONS OF THREE SEPARATE LOADS IN THE M-8A HIGH SPEED AERIAL DELIVERY CONTAINER.
AD-278 585 DIV. 29

*CONTINUUM MECHANICS

AN EQUILIBRIUM ENERGY DISTRIBUTION FUNCTION INCLUDING ROTATION IS CONSIDERED FOR A DIATOMIC MOLECULAR GAS WHICH IS FOUND TO BE CONSISTENTLY CORRECT IN GENERATING CONTINUUM EQUATIONS FROM A GENERAL TRANSPORT EQUATION.
AD-278 836 DIV. 9

*CONTROL SYSTEMS

A JOY-STICK CONTROL SYSTEM FOR MECHANIZING THE TRANSLATIONAL MOTIONS OF A STEREOCOMPARATOR.
AD-278 642 DIV. 2

A METHOD OF DEMONSTRATING THE UTILITY OF QUICKENING WITH RESPECT TO A SYNTHESIZED HYPOTHETICAL THIRD-ORDER CONTROL SYSTEM. THE SYSTEM DYNAMICS AND THE QUICKENING ARE SIMULATED THROUGH THE USE OF ANALOG COMPUTER EQUIPMENT.
AD-278 698 DIV. 30

*CONVEX SETS

AN ANALYSIS OF CONVEX CONES INVOLVING INEQUALITIES AND CONE FUNCTIONS.
AD-278 460 DIV. 15

*CORROSION

LECTURES ON FAILURE ANALYSIS, CAUSES, CURES, AND PREVENTIVE MEASURES OF CORROSION, STATIC AND DYNAMIC LOADING, THERMAL CYCLING, CORROSION, AND INERT ENVIRONMENTS, BASIC PRINCIPLES OF LUBRICATION AND LUBRICATION TECHNIQUES.
AD-278 803 DIV. 17

*CORROSION-RESISTANT ALLOYS

THE EFFECT OF MOLTEN ALKALI METALS ON CONTAINMENT METALS AND ALLOYS AT HIGH TEMPERATURES.
AD-278 654 DIV. 17

*COSMIC RAYS

DELINEATION OF TRACKS OF HEAVY COSMIC RAYS AND NUCLEAR PROCESSES WITHIN LARGE CRYSTALS OF SILVER CHLORIDE.
AD-278 672 DIV. 20

*COUPLING CIRCUITS MICROWAVE FREQUENCY

BRANCH GUIDE DIRECTIONAL COUPLERS FOR LOW AND HIGH POWER APPLICATIONS.
AD-278 717 DIV. 8

*CREEP

THE SETTLEMENTS AND TILTING OF FOOTINGS ON COMPACTED SNOW AND CERTAIN FROZEN GROUNDS ARE TREATED. SUCH FOUNDATIONS SHOW LARGE CREEP DEFORMATIONS WHEN SUBJECTED TO LOADS OF LONG DURATION.
AD-278 533 DIV. 25

OXIDE BONDING AND THE CREEP-RUPTURE STRENGTH OF NICKEL. MEASUREMENT OF THE STRENGTH OF NICKEL SPECIMENS BONDED BY SINTERED OXIDE LAYERS.
AD-278 576 DIV. 17

MECHANICAL AND THERMAL PROPERTIES OF HIGH DENSITY, ZT TYPE GRAPHITE RECRYSTALLIZED BY HOT FORMING. FIRING TESTS AS ROCKET NOZZLE MATERIAL.
AD-278 603 DIV. 14

*CRITICAL ASSEMBLIES

THE EFFECT ON HOMOGENEOUS BARE REACTORS OF A MATERIAL HAVING STRONG RESONANCE ABSORPTION BANDS IS DISCUSSED.
AD-278 467 DIV. 20

*CRYSTAL STRUCTURE

STUDY OF THE PLASTIC DEFORMATION OF METALS BY OBSERVATION OF SINGLE DISLOCATIONS. DATA ON DISLOCATIONS IN ALPHA-BRASS BY A DECORATION-ETCH PIT TECHNIQUE; BY TRANSMISSION ELECTRON MICROSCOPY AND BY MECHANICAL MEASUREMENT OF THE FRICTIONAL STRESS ACTING ON GLIDE DISLOCATIONS.
AD-278 554 DIV. 17

*CRYSTALS

THE CRYSTAL GROWTH OF FLUOALUMINATES WAS INVESTIGATED BY VARIOUS PROCESSING EXPERIMENTS. THESE INCLUDED THE BRIDGMAN, CHALMERS, AND CZOCHRALSKI METHODS, SPRAYING OF MOLTEN KALF4, VAPOR DEPOSITION OF KALF4, AND A HOT WIRE TECHNIQUE. THE CZOCHRALSKI METHOD WAS MOST PROMISING BUT WILL REQUIRE PRECISE PROCESS CONTROL.
AD-278 465 DIV. 25

*CULTURE

INDIA. A COMPENDIUM INCLUDING THE PHYSICAL SETTING, CLIMATE, THE INDIAN PEOPLES AND THEIR HISTORY, LANGUAGE AND RELIGION, THE VILLAGE, LAND TENURE AND LAND TAX, IRRIGATION, AGRICULTURE, POWER RESOURCES, MINERALS, INDUSTRY TRANSPORTATION, ETC.
AD-278 538 DIV. 32

*CURVED MIRRORS

THERMAL RADIATION GUIDES FOR TRANSMISSION OF POWER FROM SOLAR REFLECTORS.
AD-278 658 DIV. 25

*CYLINDRICAL BODIES

INITIAL YIELDING, STRAIN HARDENING, AND FRACTURE OF ZAMAK-3 TUBES FOR VARIOUS STATES OF COMBINED STRESSES. COMPARISON WITH THEORY OF RUPTURE FOR BRITTLE MATERIALS.
AD-278 746 DIV. 25

*CYLINDRICAL BODIES AERODYNAMICS

THEORETICAL AND EXPERIMENTAL DATA ARE COMBINED TO PROVIDE AN EASY METHOD OF ESTIMATING THE STATIC AND DYNAMIC STABILITY OF CYLINDRICAL BODIES WITH TANGENT OGIVES NOSE SHAPES IN COMBINATION WITH LOW ASPECT RATIO CRUCIFORM FINS.
AD-278 423 DIV. 9

*DATA PROCESSING SYSTEMS

A VARIABLE INFORMATION PROCESSING SYSTEM (VIP) FOR THE STORAGE AND RETRIEVAL OF MISSILE DATA IS DESCRIBED.
AD-278 835 DIV. 30

*DATA PROCESSING SYSTEMS MATHEMATICAL COMPUTER DATA

APPLICATION OF RECOGNITION THEORY TO MISSILE IDENTIFICATION AND DECOY DISCRIMINATION, VOLUME 2, THEORETICAL AND COMPUTATIONAL ASPECTS OF THE MAIN PROBLEM.
AD-278 687 DIV. 12

*DATA PROCESSING SYSTEMS TARGET RECOGNITION

APPLICATION OF NEW SENSOR AND DATA PROCESSING TECHNIQUES FOR RECOGNITION OF NON-COOPERATIVE AEROSPACE VEHICLES; SENSORS CHOSEN ARE GROUND BASED RF SIGNAL INTERCEPTOR AND IR-VISUAL APPEARANCE-BEHAVIOR SENSOR.
AD-278 566 DIV. 12

*DECABORANES

THE SYNTHESIS AND ISOLATION OF LESSER KNOWN OR UNKNOWN BORANES; A HIGH PRESSURE REACTIOON OF DIBORANE WITH PENTABORANE-11 PRODUCED NONABORANE-15. NONABORANE-15 DECOMPOSED AT LOW PRESSURE TO OCTABORANE AND HEXABORANE-10. DECABORANE-14 WAS ALSO FORMED.
AD-278 450 DIV. 4

SYNTHESIS, PYROLYSIS AND THERMAL STABILITY OF DECABORANE-PHOSPHINE POLYMERS.
AD-278 701 DIV. 4

SYNTHESIS OF DIPHENYLPHOSPHINODECABORANE FROM THE REACTION OF DECABORANYL SODIUM AND DIPHENYLPHOSPHINODECABORANE. CHEMICAL REACTIONS WITH LEWIS ACIDS, ALCOHOLS, AND AMINES.
AD-278 702 DIV. 4

*DECISION MAKING

SELECTED REFERENCES FROM UTILITY THEORY AND MILITARY ESSENTIALITY FOR THE STUDY OF MILITARY ESSENTIALITY MEASURES. LINEAR EXPECTED UTILITY, GROUP UTILITIES, EXPERIMENTAL WORK, DERIVATION OF MILITARY WORTH MEASURES, APPLICATION IN DECISION PROBLEMS, AND GENERAL MILITARY DECISION PROBLEMS.
AD-278 664 DIV. 15

*DECISION MAKING THEORY

A DISCUSSION IS PRESENTED ON HOW STATISTICAL AGGREGATES MAY BE USED BOTH TO IMPROVE INVENTORY MANAGEMENT AND EVALUATE CONTROL SCHEMES BASED ON SUCH USE.
AD-278 471 DIV. 26

*DEFORMATION

DISCUSSES THE MAXIMIZING THE RECOVERABLE ENERGY BY SUBJECTING A LINEAR VISCOELASTIC SOLID TO A GIVEN DEFORMATION HISTORY.
AD-278 543 DIV. 25

*DESIGN

PRELIMINARY DESIGN OF THE PROTOTYPE HIGH-ENERGY RATE RUBBER-PAD SHEET METAL-FORMING MACHINE. SPECIFICATIONS; IMPACT RUBBER FORMING; DYNAPAK.
AD-278 666 DIV. 26

*DEUTERIUM

PHOTOMESON PRODUCTION FROM NEUTRONS BOUND IN HELIUM AND DEUTERIUM WAS INVESTIGATED BY SIMULTANEOUSLY MEASURING THE ANGLE AND ENERGY OF THE MESON AND THE RECOIL PROTON.
AD-278 413 DIV. 20

*DIBORANES

THE SYNTHESIS AND ISOLATION OF LESSER KNOWN OR UNKNOWN BORANES; A HIGH PRESSURE REACTIOON OF DIBORANE WITH PENTABORANE-11 PRODUCED NONABORANE-15. NONABORANE-15 DECOMPOSED AT LOW PRESSURE TO OCTABORANE AND HEXABORANE-10. DECABORANE-14 WAS ALSO FORMED.
AD-278 450 DIV. 4

*DIES

FULL LENGTH T-SHAPE EXTRUSIONS OF MO-TI-ZR-C ALLOY WERE MADE FROM 3200F BILLET HEATING TEMPERATURE WITH A REDUCTION RATIO OF ABOUT 191. LINER PRESSURE IN EXCESS OF 200+000 PSI WAS REQUIRED TO ACCOMPLISH THE EXTRUSIONS. SURFACE QUALITY WAS FAIR.
AD-278 634 DIV. 26

*DIFFERENCE EQUATIONS

THE STRESSES INDUCED BY A PERFORATION IN AN OTHERWISE UNIFORMLY STRESSED PLATE OF ARBITRARY FINITE THICKNESS ARE ANALYZED.
AD-278 665 DIV. 25

*FINS
ASPECT RATIO

THEORETICAL AND EXPERIMENTAL DATA ARE COMBINED TO PROVIDE AN EASY METHOD OF ESTIMATING THE STATIC AND DYNAMIC STABILITY OF CYLINDRICAL BODIES WITH TANGENT OGIVES NOSE SHAPES IN COMBINATION WITH LOW ASPECT RATIO CRUCIFORM FINS.
AD-278 423 DIV. 9

*FISSION NEUTRONS

THE EFFECT ON HOMOGENEOUS BARE REACTORS OF A MATERIAL HAVING STRONG RESONANCE ABSORPTION BANDS IS DISCUSSED.
AD-278 467 DIV. 20

*FLAMES

AN IMPROVED METHOD FOR THE MEASUREMENT OF FLAME CONDUCTIVITY IS DESCRIBED. A COMPARATIVE STUDY WAS MADE BETWEEN THE ION CONCENTRATION AND THE DIFFERENT BAND SPECTRA INTENSITY EMITTED IN THE SAME FLAMES. A CORRELATION WAS ESTABLISHED BETWEEN THE OH EMISSION AND ION CONCENTRATION.
AD-278 417 DIV. 25

*FLARES
DESIGN

HUMAN FACTORS PROGRAM TO DETERMINE THE APPROXIMATE CANDLE POWER REQUIREMENTS AND GENERAL USEFULNESS OF A RECENTLY DEVELOPED GROUND FLARE.
AD-278 355 DIV. 3

*FLIGHT PATHS

THE LOAD FACTOR (G FORCE) EXERTED ON THE PILOT DURING ANY LONGITUDINAL MANEUVER MUST BE RESTRICTED TO THE PHYSIOLOGICAL TOLERANCE OF THE PILOT. RESTRICTIVE TOLERANCES OF BOTH NEGATIVE AND POSITIVE G-FORCES WHICH IMPOSE ON LOW-LEVEL, HIGH-SPEED FLIGHT WERE INVESTIGATED.
AD-278 453 DIV. 16

*FLIGHT SIMULATORS

CIRCUIT TECHNIQUES AND MEMORY DEVICES FOR IMPLEMENTING A SUBMICROSECOND SIMULATION COMPUTER ARE DISCUSSED.
AD-278 848 DIV. 30

*FLUID FLOW

THE PRINCIPLE OF MINIMUM ENTROPY PRODUCTION IS APPLIED TO OBTAIN BOUNDS ON THE DIFFUSION COEFFICIENT OF A SOLUTE IN A SUSPENSION OF SOLID PARTICLES AS WELL AS THE VISCOSITY OF THE SOLUTION.
AD-278 486 DIV. 25

THE GENERAL CHARACTER OF THE MAGNETOHYDRODYNAMIC FLOW PAST A NONCONDUCTING FLAT PLATE, IN THE PRESENCE OF TRANSVERSE MAGNETIC FIELDS, IS ANALYZED.
AD-278 682 DIV. 9

*FLUID FLOW
VELOCITY

TABLES ARE PRESENTED FOR COMPUTING THE INSTANTANEOUS VELOCITIES INDUCED AT THE BLADE AXES OF A LIFTING ROTOR IN FOREWARD FLIGHT BY THE SKEWED HELICAL WAKE VORTICES AND A METHOD FOR CALCULATING THE RESULTANT BLADE AIR LOADS.
AD-278 402 DIV. 9

*FLUID MECHANICS

FLOW NEAR THE RIM OF THE FLAT BASE OF A BODY OF REVOLUTION IS STUDIED TO ESTABLISH THE EFFECT WHICH AXIAL SYMMETRY HAS ON THE EXPANSION PROCESS.
AD-278 485 DIV. 9

THE GENERAL CHARACTER OF THE MAGNETOHYDRODYNAMIC FLOW PAST A NONCONDUCTING FLAT PLATE, IN THE PRESENCE OF TRANSVERSE MAGNETIC FIELDS, IS ANALYZED.
AD-278 682 DIV. 9

THE EXACT AND LINEARIZED DIPOLE DISTRIBUTIONS GENERATING LENTICULAR CYLINDERS IN AN INFINITE FLUID ARE COMPARED FOR VARIOUS VALUES OF A FULLNESS PARAMETER.
AD-278 726 DIV. 9

A LITERATURE SURVEY OF THE THREE TYPES OF MAGNETOHYDRODYNAMIC PROPULSORS (SHUNT, SERIES AND INDUCTION) AND A THEORY FOR ANALYZING PERFORMANCE OF J X B ACCELERATOR. MAXIMUM PROPULSION EFFICIENCY IS USED TO DETERMINE PERFORMANCE OF WORKING FLUIDS.
AD-278 837 DIV. 9

*FLUORIDES

THE CRYSTAL GROWTH OF FLUOALUMINATES WAS INVESTIGATED BY VARIOUS PROCESSING EXPERIMENTS. THESE INCLUDED THE BRIDGMAN, CHALMERS, AND CZOCHRALSKI METHODS, SPRAYING OF MOLTEN KALF4, VAPOR DEPOSITION OF KALF4, AND A HOT WIRE TECHNIQUE. THE CZOCHRALSKI METHOD WAS MOST PROMISING BUT WILL REQUIRE PRECISE PROCESS CONTROL.
AD-278 465 DIV. 25

INVESTIGATION OF ELECTRODEPOSITION METHODS FOR APPLYING THIN TEFLON COATINGS TO STEEL SUBSTRATES. THE FILMS ARE TO SERVE AS DRY LUBRICANTS AND PRESERVATIVE COATINGS.
AD-278 562 DIV. 14

*FLUORIDES
ELECTROLYSIS

RESEARCH ON FLUORINE CHEMISTRY, INCLUDING ELECTROCHEMISTRY OF HF-N2O4 AND HF-NO SYSTEMS, SYNTHESIS OF NO3F OR OF OF2 IN THE HF-NO SYSTEM DEPENDED ON ELECTRODE PASSIVATION. ELECTROLYSIS OF HF-N2O (NAF) YIELDED NF3.
AD-278 482 DIV. 10

*FLUORINE

RESEARCH ON FLUORINE CHEMISTRY, INCLUDING ELECTROCHEMISTRY OF HF-N2O4 AND HF-NO SYSTEMS, SYNTHESIS OF NO3F OR OF OF2 IN THE HF-NO SYSTEM DEPENDED ON ELECTRODE PASSIVATION. ELECTROLYSIS OF HF-N2O (NAF) YIELDED NF3.
AD-278 482 DIV. 10

*FLUOROCARBONS

GAMMA IRRADIATION ON FLUOROCARBON POLYMERS AND SMALL MOLECULES. PHYSICAL PROPERTIES; EFFECTS OF O AND CL ATMOSPHERES; RADIATION CHEMISTRY OF PERFLUOROHEPTANE, HEXAFLUOROBENZENE; INDUCED POLYMERIZATION; YIELDS OF RADICALS BY ESR.
AD-278 578 DIV. 20

*FOG

THE THEORETICAL SCATTERING PROPERTIES OF POLYDISPERSED SUSPENSIONS SUCH AS NATURAL HAZES AND CLOUDS IN THE ATMOSPHERE ARE TREATED.
AD-278 489 DIV. 25

*FOUNDATIONS (STRUCTURES)

THE SETTLEMENTS AND TILTING OF FOOTINGS ON COMPACTED SNOW AND CERTAIN FROZEN GROUNDS ARE TREATED. SUCH FOUNDATIONS SHOW LARGE CREEP DEFORMATIONS WHEN SUBJECTED TO LOADS OF LONG DURATION.
AD-278 533 DIV. 25

*FOURIER ANALYSIS

THE ESTIMATION OF THE DOPPLER SHIFT, FREQUENCY SCALE FACTOR AND AMPLITUDE OF THE SPECTRUM OF A STATIONARY GAUSSIAN RANDOM PROCESS FROM A RECORD OF LIMITED DURATION IS CONSIDERED.
AD-278 686 DIV. 25

*FRACTURE (MECHANICS)

OBSERVATIONS MADE ON THE FRACTURE SURFACES OF STEELS AND ALUMINUM ALLOYS RESULTING FROM BRITTLE, DUCTILE, FATIGUE, AND INTERGRANULAR FRACTURES.
AD-278 542 DIV. 25

THE STRESSES INDUCED BY A PERFORATION IN AN OTHERWISE UNIFORMLY STRESSED PLATE OF ARBITRARY FINITE THICKNESS ARE ANALYZED.
AD-278 645 DIV. 25

INITIAL YIELDING, STRAIN HARDENING, AND FRACTURE OF ZAMAK-3 TUBES FOR VARIOUS STATES OF COMBINED STRESSES. COMPARISON WITH THEORY OF RUPTURE FOR BRITTLE MATERIALS.
AD-278 746 DIV. 25

*FREE RADICALS

GAMMA IRRADIATION ON FLUOROCARBON POLYMERS AND SMALL MOLECULES. PHYSICAL PROPERTIES; EFFECTS OF O AND CL ATMOSPHERES; RADIATION CHEMISTRY OF PERFLUOROHEPTANE, HEXAFLUOROBENZENE; INDUCED POLYMERIZATION; YIELDS OF RADICALS BY ESR.
AD-278 578 DIV. 20

*FRICTION

A STEADY, INCOMPRESSIBLE, ELECTRICALLY CONDUCTING, LAMINAR BOUNDARY LAYER OVER A SEMI-INFINITE FLAT PLATE IS TREATED.
AD-278 694 DIV. 9

*FUEL TANKS
MODEL TESTS

COMPLETENESS OF REACTION, RADIANT HEAT FLUX, AND TOXIC VAPOR DESTRUCTION TESTS OF TITAN II FUEL TANKAGE SYSTEMS.
AD-278 607 DIV. 10

*FUNCTIONAL ANALYSIS

AN ANALYSIS OF CONVEX CONES INVOLVING INEQUALITIES AND CONE FUNCTIONS.
AD-278 460 DIV. 15

*GAMES THEORY

SELECTED REFERENCES FROM UTILITY THEORY AND MILITARY ESSENTIALITY FOR THE STUDY OF MILITARY ESSENTIALITY MEASURES. LINEAR EXPECTED UTILITY, GROUP UTILITIES, EXPERIMENTAL WORK, DERIVATION OF MILITARY WORTH MEASURES, APPLICATION IN DECISION PROBLEMS, AND GENERAL MILITARY DECISION PROBLEMS.
AD-278 664 DIV. 15

*GAS BEARINGS

THEORETICAL DATA ARE PRESENTED FOR THE DESIGN OF COMPLETE FILM, SELF-ACTING JOURNAL BEARINGS, OPERATING UNDER STEADY STATE CONDITIONS, AND USING EITHER LIQUIDS, VAPORS OR GASES.
AD-278 660 DIV. 26

*GAS DISCHARGES

HIGH FREQUENCY GASEOUS BREAKDOWN UNDER CONDITIONS OF NON-UNIFORM ELECTRIC FIELDS; BREAKDOWN FIELDS MEASURED IN THREE RESONANT CAVITIES AT X BAND; CALCULATION OF EFFECTIVE DIFFUSION LENGTHS FOR THE NON-UNIFORM FIELD CAVITIES.
AD-278 568 DIV. 25

ENERGY TRANSFER ON A NON-ABLATING METAL ANODE OF A HIGH-INTENSITY ARGON ARC. ENERGY BALANCE OF A TRANSPIRATION-COOLED POROUS CARBON ANODE OF A HIGH-INTENSITY ARGON ARC.
AD-278 570 DIV. 25

*GAS FLOW

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

EFFECT OF DISCONTINUITY OF SURFACE CATALYCITY ON BOUNDARY LAYER FLOW OF DISSOCIATED GAS.
AD-278 534 DIV. 25

AN EQUILIBRIUM ENERGY DISTRIBUTION FUNCTION INCLUDING ROTATION IS CONSIDERED FOR A DIATOMIC MOLECULAR GAS WHICH IS FOUND TO BE CONSISTENTLY CORRECT IN GENERATING CONTINUUM EQUATIONS FROM A GENERAL TRANSPORT EQUATION.
AD-278 834 DIV. 9

*GAS IONIZATION

AN IMPROVED METHOD FOR THE MEASUREMENT OF FLAME CONDUCTIVITY IS DESCRIBED. A COMPARATIVE STUDY WAS MADE BETWEEN THE ION CONCENTRATION AND THE DIFFERENT BAND SPECTRA INTENSITY EMITTED IN THE SAME FLAMES. A CORRELATION WAS ESTABLISHED BETWEEN THE OH EMISSION AND ION CONCENTRATION.
AD-278 417 DIV. 25

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

AN EQUILIBRIUM ENERGY DISTRIBUTION FUNCTION INCLUDING ROTATION IS CONSIDERED FOR A DIATOMIC MOLECULAR GAS WHICH IS FOUND TO BE CONSISTENTLY CORRECT IN GENERATING CONTINUUM EQUATIONS FROM A GENERAL TRANSPORT EQUATION.
AD-278 834 DIV. 9

*GEOGRAPHY

INDIA. A COMPENDIUM INCLUDING THE PHYSICAL SETTING, CLIMATE, THE INDIAN PEOPLES AND THEIR HISTORY, LANGUAGE AND RELIGION, THE VILLAGE, LAND TENURE AND LAND TAX, IRRIGATION, AGRICULTURE, POWER RESOURCES, MINERALS, INDUSTRY TRANSPORTATION, ETC.
AD-278 538 DIV. 32

*GLASS TEXTILES

POTENTIAL OF FILAMENT WOUND COMPOSITES. EFFECT OF HUMIDITY CYCLING ON THE TENSILE STRENGTH OF SINGLE E-GLASS FIBERS COATED WITH EPOXY RESIN. A LARGE DEFLECTION THEORY OF ASYMMETRICALLY LAMINATED ANISOTROPIC PLATES.
AD-278 572 DIV. 14

*GRAPHITE

MECHANICAL AND THERMAL PROPERTIES OF HIGH DENSITY, ZT TYPE GRAPHITE RECRYSTALLIZED BY HOT FORMING. FIRING TESTS AS ROCKET NOZZLE MATERIAL.
AD-278 603 DIV. 14

*GRAVITY

THE PRECESSION RATE OF THE SPIN AXIS OF A SPHERICAL GYROSCOPE MOVING THROUGH THE EARTH'S GRAVITATIONAL FIELD IS DISCUSSED IN RELATION TO THE THEORY OF RELATIVITY.
AD-278 437 DIV. 25

*GREEN'S FUNCTION

GIVEN THE SHAPE OF A PULSE OF ELECTROMAGNETIC RADIATION AT A KNOWN DISTANCE FROM THE SOURCE,

***ELECTRIC INSULATION**

AN ANNOTATED BIBLIOGRAPHY OF RADIATION EFFECTS ON COAXIAL CABLES AND ELECTRIC INSULATION MATERIALS TO FEBRUARY 1962.
AD-278 674 DIV. 20

***ELECTRIC POWER PRODUCTION**

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. STANDARD CERAMIC BODIES OF SIMPLE AND MULTIPLE OXIDES WERE FORMED. TEMPERATURE, SEEBECK COEFFICIENT, AND RESISTIVITY VALUES ARE TABULATED FOR 47 STANDARD CERAMIC BODY COMPOSITIONS.
AD-278 452 DIV. 25

HIGH-TEMPERATURE VAPOR-FILLED THERMIONIC CONVERTER USING A URANIUM-ZIRCONIUM-CARBIDE EMITTER AND A HIGH-TEMPERATURE NICKEL COLLECTOR.
AD-278 816 DIV. 7

***ELECTRIC POWER PRODUCTION**
THERMIONIC EMISSION

EVALUATION OF A MOLYBDENUM EMITTER, LOW VOLTAGE ARC THERMIONIC POWER CONVERTER.
AD-278 817 DIV. 8

***ELECTRIC POWER PRODUCTION**
THERMOELECTRICITY

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. DATA ON THE FOLLOWING STANDARD CERAMIC BODIES IS TABULATED: COMBINATIONS CONSISTING OF VARIOUS MS ADDITIONS OF Y203, LA203 OR NB205 TO CEO2; VARIOUS MS ADDITIONS OF CDO, BI203, SB205, MOO3 OR W03 TO PBNB206 OR PB2NB207.
AD-278 451 DIV. 25

***ELECTRICAL NETWORKS**
THEORY

THE RESEARCH IN NETWORK THEORY AND PRACTICE IS PRESENTED WITH EMPHASIS ON UNCONVENTIONAL TECHNIQUES AND CIRCUIT ELEMENTS CARRIED OUT FOR LUMPED, DISTRIBUTED AND ACTIVE SYSTEMS.
AD-278 463 DIV. 25

***ELECTRICAL PROPERTIES**

APPARATUS AND TECHNIQUES FOR MAINTAINING ISOLATED MAMMALIAN CEREBRAL TISSUE IN AN EXCITABLE CONDITION ARE PRESENTED.
AD-278 673 DIV. 16

***ELECTRICITY**

THEORETICAL AND EXPERIMENTAL STUDIES TO DETERMINE THE FEASIBILITY OF APPLYING ELECTRON BLACKBODIES TO THERMIONIC ENERGY CONVERSION.
AD-278 824 DIV. 8

***ELECTROCHEMISTRY**
OXYGEN

ELECTROCHEMICAL BEHAVIOR OF O2 AND H2O2 ON NI, CO, CR AND STAINLESS STEEL ELECTRODES.
AD-278 690 DIV. 4

***ELECTROCHEMISTRY**
PEROXIDES

ELECTROCHEMICAL BEHAVIOR OF O2 AND H2O2 ON NI, CO, CR AND STAINLESS STEEL ELECTRODES.
AD-278 690 DIV. 4

***ELECTRODES**

ELECTRICAL BREAKDOWN IN HIGH VACUUM.
AD-278 564 DIV. 25

ELECTROCHEMICAL BEHAVIOR OF O2 AND H2O2 ON NI, CO, CR AND STAINLESS STEEL ELECTRODES.
AD-278 690 DIV. 4

***ELECTROLYSIS**

RESEARCH ON FLUORINE CHEMISTRY, INCLUDING ELECTROCHEMISTRY OF HF-N2O4 AND HF-NO SYSTEMS, SYNTHESIS OF NO3F OR OF F2 IN THE HF-NO SYSTEM DEPENDED ON ELECTRODE PASSIVATION. ELECTROLYSIS OF HF-N2O (NAF) YIELDED NF3.
AD-278 482 DIV. 10

***ELECTROLYTIC CAPACITORS**

DESIGN AND DEVELOPMENT OF SOLID ELECTROLYTE TANTALUM CAPACITORS, ONE CAPABLE OF OPERATION AT 100 VOLTS AT 85 C, THE OTHER AT 20 VOLTS AT 85 C.
AD-278 820 DIV. 8

***ELECTROMAGNETIC FIELDS**

GIVEN THE SHAPE OF A PULSE OF ELECTROMAGNETIC RADIATION AT A KNOWN DISTANCE FROM THE SOURCE, AN ANALYTIC EXPRESSION IS DERIVED IN THE ELECTRIC DIPOLE APPROXIMATION THAT YIELDS THE SHAPE OF THE PULSE AT ANY OTHER POINT.
AD-278 676 DIV. 8

***ELECTROMAGNETIC FIELDS**
MEASUREMENT

LOOPS AND DIPOLES AS ELECTROMAGNETIC FIELD MEASURING SENSORS; STABILITY FOR NEAR FIELD MEASUREMENTS; INTERACTION ERRORS; POWER DENSITY MEASUREMENTS IN THE NEAR FIELD.
AD-278 692 DIV. 8

***ELECTROMAGNETIC THEORY**

GIVEN THE SHAPE OF A PULSE OF ELECTROMAGNETIC RADIATION AT A KNOWN DISTANCE FROM THE SOURCE, AN ANALYTIC EXPRESSION IS DERIVED IN THE ELECTRIC DIPOLE APPROXIMATION THAT YIELDS THE SHAPE OF THE PULSE AT ANY OTHER POINT.
AD-278 676 DIV. 8

***ELECTROMAGNETIC WAVES**

THE SYMMETRY PROPERTIES OF WEAK, ELECTROMAGNETIC, AND STRONG INTERACTIONS OF ELEMENTARY PARTICLES ARE DISCUSSED.
AD-278 435 DIV. 25

LOOPS AND DIPOLES AS ELECTROMAGNETIC FIELD MEASURING SENSORS; STABILITY FOR NEAR FIELD MEASUREMENTS; INTERACTION ERRORS; POWER DENSITY MEASUREMENTS IN THE NEAR FIELD.
AD-278 692 DIV. 8

THE MULTIPLE SCATTERING OF PLANE WAVES BY TWO IDENTICAL INFINITE, WIDELY SPACED, PARALLEL ELLIPTIC CYLINDERS IS TREATED. THE MAJOR AXES ARE CONSIDERED AS PARALLEL AND THE MINOR AXES CO-LINEAR AND VICE-VERSA.
AD-278 748 DIV. 8

***ELECTRON BEAMS**

VARIABLE-PITCH HELIX TRAVELING WAVE TUBE, BEATING-WAVE KLYSTRON, X-BAND ELLIPTIC-CAVITY COUPLER, MAGNETRON INJECTION GUN, SPACE-CHARGE WEIGHTING FUNCTIONS FOR A FINITE-DIAMETER ELECTRON BEAM.
AD-278 569 DIV. 8

FORMATION OF STABLE AND WELL-FOCUSED, HIGH-PERVEANCE, LARGE DIAMETER, HOLLOW-BEAMS BY MAGNETRON INJECTION-TYPE GUNS AND PIERCE-TYPE GUN DERIVATIVES.
AD-278 828 DIV. 8

***ELECTRON GUNS**

VARIABLE-PITCH HELIX TRAVELING WAVE TUBE, BEATING-WAVE KLYSTRON, X-BAND ELLIPTIC-CAVITY COUPLER, MAGNETRON INJECTION GUN, SPACE-CHARGE WEIGHTING FUNCTIONS FOR A FINITE-DIAMETER ELECTRON BEAM.
AD-278 569 DIV. 8

FORMATION OF STABLE AND WELL-FOCUSED, HIGH-PERVEANCE, LARGE DIAMETER, HOLLOW-BEAMS BY MAGNETRON INJECTION-TYPE GUNS AND PIERCE-TYPE GUN DERIVATIVES.
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***ELECTRON TRANSITIONS**

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INDIA. A COMPENDIUM INCLUDING THE PHYSICAL SETTING: CLIMATE: THE INDIAN PEOPLES AND THEIR HISTORY: LANGUAGE AND RELIGION: THE VILLAGE: LAND TENURE AND LAND TAX: IRRIGATION: AGRICULTURE: POWER RESOURCES: MINERALS: INDUSTRY TRANSPORTATION: ETC.
AD-278 538 DIV. 32

*INDICATOR LIGHTS
COLORS

COLOR CONVERSION FILTERS FOR ELECTROLUMINESCENT LIGHT. APPLIED WHERE LOW-LEVEL NONCATASTROPHIC LIGHTING IS REQUIRED SUCH AS WITH INDICATORS: READOUTS: OR DISPLAYS.
AD-278 767 DIV. 25

*MESONS

PHOTOMESON PRODUCTION FROM NEUTRONS BOUND IN HELIUM AND DEUTERIUM WAS INVESTIGATED BY SIMULTANEOUSLY MEASURING THE ANGLE AND ENERGY OF THE MESON AND THE RECOIL PROTON.
AD-278 413 DIV. 20

THE EXTENT TO WHICH MULTI-PION RESONANCES CAN BE ACCOUNTED FOR IN TERMS OF A SELF-COUPLED PION FIELD, WITHOUT EXPLICIT INTRODUCTION OF A PION-NUCLEON INTERACTION IS EXAMINED. A METHOD IS PROPOSED FOR THE QUANTIZATION SELF-COUPLED BOSON FIELDS.
AD-278 436 DIV. 25

*METABOLISM
MEASUREMENT

ECOLOGICAL AND SEASONAL VARIATIONS INFLUENCE THE CALORIC INTAKE AND ARE FUNDAMENTAL FEATURES OF AN IMPROVED COLD RESISTANCE OR ACCLIMATIZATION. IMPROVED INSULATION EXTENDS THE RANGE OVER WHICH AN ANIMAL IS ABLE TO MAINTAIN THERMAL BALANCE.
AD-278 527 DIV. 16

*METAL FILMS
PHYSICAL PROPERTIES

THE TEMPERATURE COEFFICIENT OF RESISTANCE IN ULTRATHIN, EVAPORATED METAL FILMS (INVESTIGATION OF METAL THIN FILM FORMATION AND STRUCTURE).
AD-278 557 DIV. 17

*METAL FORMING PRESSES

PRELIMINARY DESIGN OF THE PROTOTYPE HIGH-ENERGY RATE RUBBER-PAD SHEET METAL-FORMING MACHINE. SPECIFICATIONS; IMPACT RUBBER FORMING; DYNAPAK.
AD-278 666 DIV. 26

*METAL JOINTS

EVALUATION OF 18-7-5 (INCO 250 KSI) AND 18-9-5 (INCO 300 KSI) NICOMO MAR-AGING STEELS LED TO THE SELECTION OF THE LATTER FOR APPLICATION IN PRESSURE VESSELS REQUIRING MATERIAL STRENGTHS IN EXCESS OF 250,000 PSI. BASIC WELDABILITY CHARACTERISTICS WERE EXCELLENT.
AD-278 710 DIV. 17

*METAL PLASTIC ADHESIVES

MATERIAL - ADHESIVE - METAL TO METAL - FMS-0015 AND FMS-0016 - SYNTHETIC OILS AND WEATHERING - TESTS.
AD-278 558 DIV. 14

*METAL PLATES
FAILURE (MECHANICS)

FAILURE OF THIN METAL PLATES (AL) UNDER HYPERVELOCITY IMPACT; GEOMETRICAL FEATURES OF PERFORATIONS; AND SPATIAL, MASS, AND VELOCITY DISTRIBUTIONS OF EJECTA PRODUCED.
AD-278 641 DIV. 22

*METAL PLATES
FATIGUE (MECHANICS)

ALUMINUM PANELS WITH AND WITHOUT A STITCHED LAMINATE INSULATION SYSTEM WERE EVALUATED FOR SONIC FATIGUE. THE INSULATION SYSTEM DID NOT SHORTEN THE SONIC FATIGUE LIFE AND WAS NOT VISIBLY DAMAGED BY SOUND LEVELS TO 170 DB.
AD-278 665 DIV. 1

*METALLIC CRYSTALS

RESEARCH ON THE BEHAVIOR OF METALLIC CRYSTALS INCLUDED THE FOLLOWING STUDIES; CONTROLLED OXIDATION OF CD SINGLE- AND BI-CRYSTALS; DECORATION OF CD BI-CRYSTALS BY VAPOR DEPOSITION OF CD; DECORATION MECHANISM OF ZN ON CD SINGLE- AND BI-CRYSTALS; CONTROLLED REDUCTION OF HEMATITE CRYSTALS.
AD-278 481 DIV. 4

STUDY OF THE PLASTIC DEFORMATION OF METALS BY OBSERVATION OF SINGLE DISLOCATIONS. DATA ON DISLOCATIONS IN ALPHA-BRASS BY A DECORATION-ETCH PIT TECHNIQUE, BY TRANSMISSION ELECTRON MICROSCOPY AND BY MECHANICAL MEASUREMENT OF THE FRICTIONAL STRESS ACTING ON GLIDE DISLOCATIONS.
AD-278 554 DIV. 17

*METALLIC TEXTILES

PROCEDURES AND TECHNIQUES FOR MANUFACTURING LARGE LOW-DENSITY AIRMAT STRUCTURES MADE OF METALLIC CLOTH AND YARNS CAPABLE OF SMALL VOLUME PACKAGING. MACHINE DESIGN AND SPECIFICATIONS.
AD-278 667 DIV. 14

*METALLURGY

THE TEMPERATURE COEFFICIENT OF RESISTANCE IN ULTRATHIN, EVAPORATED METAL FILMS (INVESTIGATION OF METAL THIN FILM FORMATION AND STRUCTURE).
AD-278 557 DIV. 17

*METALORGANIC COMPOUNDS
SYNTHESIS

SUBSTITUTION-ADDITION REACTIONS OF EXCESS BERYLLIUM(II) AND CHROMIUM(III) ACETYLACETONATES WITH DIPHENYLPHOSPHINIC ACID CARRIED OUT IN MELTS YIELD THE DIMERS, (BE(C5H702)(OP(C6H5)2O))2 AND (CR(C5H702)2(OP(C6H5)2O))2. THE DIPHENYLPHOSPHINATE ANION ACTS AS A CATENATING GROUP; CYCLIC OLIGOMERS FORMED IN PREFERENCE TO LINEAR POLYMERS.
AD-278 462 DIV. 4

*METALS

THE ROLE OF OXYGEN IN THE BRITTLE BEHAVIOR OF METALS.
AD-278 576 DIV. 17

THE EFFECT OF MOLTEN ALKALI METALS ON CONTAINMENT METALS AND ALLOYS AT HIGH TEMPERATURES.
AD-278 654 DIV. 17

TWO CORRELATIONS HAVE BEEN PROPOSED. THE FIRST RELATES THE DISSOCIATION ENERGY OF HOMONUCLEAR DIATOMIC MOLECULES TO THE LATTICE ENERGY OF THE CORRESPONDING ELEMENTS. THE SECOND RELATES THE LATTICE ENERGY TO THE PROMOTIONAL ENERGY OF A CONFIGURATION COMPOSED OF LOW-LYING EXCITED LEVELS OF THE ATOM.
AD-278 830 DIV. 25

*METALS
DEFORMATION

STUDY OF THE PLASTIC DEFORMATION OF METALS BY OBSERVATION OF SINGLE DISLOCATIONS. DATA ON DISLOCATIONS IN ALPHA-BRASS BY A DECORATION-ETCH PIT TECHNIQUE, BY TRANSMISSION ELECTRON MICROSCOPY AND BY MECHANICAL MEASUREMENT OF THE FRICTIONAL STRESS ACTING ON GLIDE DISLOCATIONS.
AD-278 554 DIV. 17

*METALS
MATHEMATICAL ANALYSIS

TRANSITION THEORY OF ELASTIC-PLASTIC DEFORMATION IS APPLIED TO THE PLASTIC BENDING OF A RECTANGULAR SHEET.
AD-278 737 DIV. 17

*METALS
MECHANICAL PROPERTIES

THE EFFECTS OF SOLUTES ON THE DUCTILE-TO-BRITTLE TRANSITION IN REFRACTORY METALS.
AD-278 652 DIV. 17

*METEOROLOGICAL RADAR

ANGULAR DENSITY AND RANGE DISTRIBUTION OF RADAR ECHOES FROM METEOR TRAILS; IN THE CASE OF UNIFORM DISTRIBUTION OF GEOCENTRIC RADIANTS.
AD-278 812 DIV. 2

THE VOLUME DENSITY OF RADAR ECHOES FROM METEOR TRAILS IN TWO PARTICULAR CASES OF HELIOCENTRIC RADIANT DISTRIBUTION.
AD-278 814 DIV. 2

*METEOROLOGICAL RADIO

STUDIES ON THE DISTRIBUTION OF RADIO ECHOES FROM METEOR TRAILS.
AD-278 813 DIV. 2

*METHYL HYDRAZINES

A METHOD FOR THE DETERMINATION OF MIXTURES OF HYDRAZINE, 1, 1-DIMETHYLHYDRAZIINE AND DIETHYLENE TRIAMIVE IS DISCUSSED. THE MIXTURE CAN BE DETERMINED IN 2 ALIQUOTS OF ACETIC ACID BEFORE AND AFTER THE ADDITION OF SALICYLALDEHYDE AND ONE ALIQUOT IN METHANOL AFTER THE ADDITION OF SALICYLALDEHYDE.
AD-278 499 DIV. 4

BURNING RATES, EXTINGUISHING AGENTS AND EXTINGUISHMENT MECHANISMS WERE DETERMINED FOR OPEN-PAN FIRES OF N2H4; UDMH; JP-XX, A 50-50 MIXTURE OF N2H4 AND UDMH OXIDIZED BY AIR AND N204 WAS STUDIED IN OPEN-PANS AND IN A 1/50 SCALE MODEL OF A TITAN II SILO.
AD-278 802 DIV. 10

*MICROMINIATURIZATION (ELECTRONICS)

HISTORY OF THE MICROELECTRONICS PROGRAM. COMPONENTS FABRICATION TECHNIQUES. OBJECTIVES OF THE BUREAU OF NAVAL WEAPONS MICROELECTRONICS PROGRAM.
AD-278 449 DIV. 8

AN ANNOTATED BIBLIOGRAPHY OF PRINTED CIRCUITS AND WELDED MODULES. MICROMINIATURIZATION OF CIRCUITS AND COMPONENTS FROM A MANUFACTURING RESEARCH VIEWPOINT. DESIGN STANDARDS AND PROCEDURES; PRODUCTION METHODS AND TECHNIQUES; AND APPLICATIONS. CONTINUATION OF AD-271 035; TO END OF 1961.
AD-278 631 DIV. 8

*MICROMINIATURIZATION (ELECTRONICS)
DIGITAL SYSTEMS

APPLICATION OF MICROELECTRONICS IN AIRBORNE ELECTRONIC EQUIPMENT; TEST RESULTS; APPLICATION; R AND D; AVAILABILITY; STANDARDIZATION.
AD-278 699 DIV. 8

*MICROWAVE AMPLIFIERS

VOLTAGE-TUNABLE MICROWAVE OSCILLATOR FOR SATELLITE VEHICLE TELEMETRY TRANSMITTERS; 10 WATT RADIATING POWER SOURCE; ELECTROSTATICALLY-FOCUSED TRAVELING-WAVE TUBE AMPLIFIER WHICH FEEDS-BACK POWER TO ITS INPUT THROUGH A MICROWAVE CAVITY.
AD-278 713 DIV. 8

*MICROWAVE EQUIPMENT

MICROWAVE RESEARCH SPACE-CHARGE WAVES; TRANSVERSE-WAVE FREQUENCY DOUBLERS; KLYSTRON EFFICIENCY; ELECTRON-BEAM INTERACTION THEORY; PARAMETRIC REFRIGERATION; NONLINEAR QUANTUM EFFECTS; MASER RESEARCH; NONLINEAR EFFECTS IN SEMICONDUCTORS; FERRITE NONLINEAR PROPAGATION; GENERATION OF SUBMILLIMETER WAVELENGTHS; PLASMA HARMONIC GENERATION.
AD-278 448 DIV. 8

TRANSMISSION SYSTEMS FOR USE IN THE SUBMILLIMETER WAVELENGTH REGION; THEORETICAL ANALYSIS TROUGH WAVEGUIDES; ATTENUATION CHARACTERISTICS OF WAVEGUIDE STRUCTURES.
AD-278 636 DIV. 8

*MICROWAVE NETWORKS

MICROWAVE RESEARCH SPACE-CHARGE WAVES; TRANSVERSE-WAVE FREQUENCY DOUBLERS; KLYSTRON EFFICIENCY; ELECTRON-BEAM INTERACTION THEORY; PARAMETRIC REFRIGERATION; NONLINEAR QUANTUM EFFECTS; MASER RESEARCH; NONLINEAR EFFECTS IN SEMICONDUCTORS; FERRITE NONLINEAR PROPAGATION; GENERATION OF SUBMILLIMETER WAVELENGTHS; PLASMA HARMONIC GENERATION.
AD-278 448 DIV. 8

*MICROWAVE OSCILLATORS

VOLTAGE-TUNABLE MICROWAVE OSCILLATOR FOR SATELLITE VEHICLE TELEMETRY TRANSMITTERS; 10 WATT RADIATING POWER SOURCE; ELECTROSTATICALLY-FOCUSED TRAVELING-WAVE TUBE AMPLIFIER WHICH FEEDS-BACK POWER TO ITS INPUT THROUGH A MICROWAVE CAVITY.
AD-278 713 DIV. 8

*MICROWAVES

MICROWAVE INTERFEROMETRY IS ADOPTED TO MEASURE THE EFFECTIVE COLLISION CROSS SECTION FOR MOMENTUM TRANSFER OF THERMAL ELECTRONS WITH CESIUM ATOMS IN THE AFTERGLOW OF PURE CESIUM AND HELIUM-CESIUM DISCHARGES.
AD-278 563 DIV. 25

MICROWAVE ENERGY CONVERSION TO DIRECT CURRENT BY HIGH-FREQUENCY SEMICONDUCTOR DIODES.
AD-278 703 DIV. 8

*MICROWAVES
EXTREMELY HIGH FREQUENCY

TRANSMISSION SYSTEMS FOR USE IN THE SUBMILLIMETER WAVELENGTH REGION; THEORETICAL ANALYSIS TROUGH WAVEGUIDES; ATTENUATION CHARACTERISTICS OF WAVEGUIDE STRUCTURES.
AD-278 636 DIV. 8

*MICROWAVES
SCIENTIFIC RESEARCH

MICROWAVE RESEARCH SPACE-CHARGE WAVES; TRANSVERSE-WAVE FREQUENCY DOUBLERS; KLYSTRON EFFICIENCY; ELECTRON-BEAM INTERACTION THEORY; PARAMETRIC REFRIGERATION; NONLINEAR QUANTUM EFFECTS; MASER RESEARCH; NONLINEAR EFFECTS IN SEMICONDUCTORS; FERRITE NONLINEAR PROPAGATION; GENERATION OF SUBMILLIMETER WAVELENGTHS; PLASMA HARMONIC GENERATION.
AD-278 448 DIV. 8

*MILITARY EQUIPMENT

THE ENVIRONMENTAL PROBLEMS AFFECTING TRANSPORTATION SUPPORT IN MILITARY OPERATIONS WERE STUDIED.
AD-278 596 DIV. 33

*MILITARY OPERATIONS

THE ENVIRONMENTAL PROBLEMS AFFECTING TRANSPORTATION SUPPORT IN MILITARY OPERATIONS WERE STUDIED.
AD-278 596 DIV. 33

*MILITARY OPERATIONS
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SELECTED REFERENCES FROM UTILITY THEORY AND MILITARY ESSENTIALITY FOR THE STUDY OF MILITARY ESSENTIALITY MEASURES; LINEAR EXPECTED UTILITY; GROUP UTILITIES; EXPERIIMENTAL WORK; DERIVATION OF MILITARY WORTH MEASURES; APPLICATION IN DECI-

*LIGHT
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PROBLEMS OF AN OPTICAL RADAR SYSTEM: USEFULNESS OF COMMERCIALLY AVAILABLE LASERS FOR SUCH A SYSTEM: AND SOLID STATE RESEARCH PROVIDING NEW MATERIALS FOR LASER-TYPE DEVICES.
AD-278 640 DIV. 6

*LIGHT TRANSMISSION

TRANSMISSION, SCATTERING, AND POLARIZATION OF OPTICAL RADIATION IN ATMOSPHERIC AEROSOLS.
AD-278 685 DIV. 2

*LINEAR SYSTEMS

THE ROLE OF CONSTRAINTS IN THE THEORY OF LEAST SQUARES.
AD-278 739 DIV. 15

*LIQUID METALS

THE ROLE OF OXYGEN IN THE BRITTLE BEHAVIOR OF METALS.
AD-278 976 DIV. 17

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AD-278 694 DIV. 17

*LIQUID ROCKET PROPELLANTS
COMBUSTION

COMPLETENESS OF REACTION, RADIANT HEAT FLUX, AND TOXIC VAPOR DESTRUCTION TESTS OF TITAN II FUEL TANKAGE SYSTEMS.
AD-278 607 DIV. 10

*LIQUID ROCKET PROPELLANTS
FIRES

BURNING RATES, EXTINGUISHING AGENTS AND EXTINGUISHMENT MECHANISMS WERE DETERMINED FOR OPEN-PAN FIRES OF N2H4, UDMH, JP-XX, A 50-50 MIXTURE OF N2H4 AND UDMH OXIDIZED BY AIR AND N204 WAS STUDIED IN OPEN-PANS AND IN A 1/30 SCALE MODEL OF A TITAN II SILO.
AD-278 802 DIV. 10

*LIQUIDS

VAPOR PRESSURES IN THE LIQUID SYSTEM RB2O-B2O3. MEASUREMENT BY TRANSPIRATION METHOD. DERIVED THERMODYNAMIC DATA AND A STRUCTURAL INTERPRETATION.
AD-278 573 DIV. 4

*LITHIUM COMPOUNDS

NUCLEAR RESONANCE STUDIES INCLUDED THE NUCLEAR MAGNETIC RESONANCE OF AL IN RUBY AND LICL AND LIF CONTAINING MN ION IMPURITIES. ELECTRON PARAMAGNETIC RESONANCE STUDIES INDICATED THAT THE MN ION EXISTED IN A DILUTE AND CONCENTRATED PHASE IN LICL: IN LIF THIS TENDENCY DID NOT OCCUR UP TO 10 MOLE-% MN ION.
AD-278 429 DIV. 25

*LOGISTICS

NOTES ON SOME ENVIRONMENTAL CONDITIONS AFFECTING MILITARY LOGISTICS IN THAILAND.
AD-278 584 DIV. 18

*LOOP ANTENNAS

LOOPS AND DIPOLES AS ELECTROMAGNETIC FIELD MEASURING SENSORS: STABILITY FOR NEAR FIELD MEASUREMENTS: INTERACTION ERRORS: POWER DENSITY MEASUREMENTS IN THE NEAR FIELD.
AD-278 692 DIV. 8

*LOW PASS FILTERS

L-BAND MODEL OF A HIGH-POWER, WIDE-BAND, LOW-PASS, BAFFLE-IRON, WAVEGUIDE FILTER.
AD-278 718 DIV. 8

*LUBRICANTS
FILMS

INVESTIGATION OF ELECTRODEPOSITION METHODS FOR APPLYING THIN TEFLON COATINGS TO STEEL SUBSTRATES. THE FILMS ARE TO SERVE AS DRY LUBRICANTS AND PRESERVATIVE COATINGS.
AD-278 562 DIV. 14

*LUBRICANTS
TESTS

STUDIES OF GEAR LUBRICATION, BEARING LUBRICATION, LUBRICANT OXIDATION, AND IMPACT SENSITIVITY OF MATERIALS IN CONTACT WITH STRONG OXIDIZERS. LUBRICATION RESEARCH AND TEST METHOD DEVELOPMENT FOR AEROSPACE PROPULSION LUBRICANTS.
AD-278 547 DIV. 14

*LUBRICATION

THEORETICAL DATA ARE PRESENTED FOR THE DESIGN OF COMPLETE FILM, SELF-ACTING JOURNAL BEARINGS, OPERATING UNDER STEADY STATE CONDITIONS, AND USING EITHER LIQUIDS, VAPORS OR GASES.
AD-278 660 DIV. 26

LECTURES ON FAILURE ANALYSIS. CAUSES, CURES, AND PREVENTIVE MEASURES OF CORROSION. STATIC AND DYNAMIC LOADING. THERMAL CYCLING. CORROSION AND INERT ENVIRONMENTS. BASIC PRINCIPLES OF LUBRICATION AND LUBRICATION TECHNIQUES.
AD-278 803 DIV. 17

*LUBRICATION
TESTS

STUDIES OF GEAR LUBRICATION, BEARING LUBRICATION, LUBRICANT OXIDATION, AND IMPACT SENSITIVITY OF MATERIALS IN CONTACT WITH STRONG OXIDIZERS. LUBRICATION RESEARCH AND TEST METHOD DEVELOPMENT FOR AEROSPACE PROPULSION LUBRICANTS.
AD-278 547 DIV. 14

*LUNAR PROBES

PONTECOULANT'S SOLUTION OF THE THREE-BODY PROBLEM OF THE LUNAR THEORY IS APPLIED TO THE MOTION OF A LUNAR SATELLITE PERTURBED BY THE EARTH TO OBTAIN AN ESTIMATE OF THE CHANGES CAUSED IN THE RADIAL COORDINATE.
AD-278 709 DIV. 12

*MAGNETIC CORES

A BINDER HAVING THE COMPOSITION IN THE SYSTEM NA2O.XRO2.(3-X)SIO2 (RO2 BEING ZRO2 AND TIO2) WAS DEVELOPED FOR GRAIN-ORIENTED SI STEEL WOULD CUT C-TYPE CORES FOR OPERATION WITHIN -55 TO 600 C. THE BINDER DID NOT DEGRADE THE MAGNETIC PROPERTIES OF THE CORE.
AD-278 734 DIV. 7

*MAGNETIC FIELDS

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

THE GENERAL CHARACTER OF THE MAGNETOHYDRODYNAMIC FLOW PAST A NONCONDUCTING FLAT PLATE, IN THE PRESENCE OF TRANSVERSE MAGNETIC FIELDS, IS ANALYZED.
AD-278 682 DIV. 9

A STEADY, INCOMPRESSIBLE, ELECTRICALLY CONDUCTING, LAMINAR BOUNDARY LAYER OVER A SEMI-INFINITE FLAT PLATE IS TREATED.
AD-278 694 DIV. 9

*MAGNETIC MATERIALS

A BINDER HAVING THE COMPOSITION IN THE SYSTEM NA2O.XRO2.(3-X)SIO2 (RO2 BEING ZRO2 AND TIO2) WAS DEVELOPED FOR GRAIN-ORIENTED SI STEEL WOULD CUT C-TYPE CORES FOR OPERATION WITHIN -55 TO 600 C. THE BINDER DID NOT DEGRADE THE MAGNETIC PROPERTIES OF THE CORE.
AD-278 734 DIV. 7

*MAGNETIC TAPE

A SYSTEM FOR THE AVERAGING AND ANALYSIS OF REPEATED EEG, SIGNALS, EMPLOYING A CLOSED-LOOP MAGNETIC TAPE AND PULSE-INTERVAL MODULATION.
AD-278 590 DIV. 8

*MAGNETOHYDRODYNAMICS

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

THE GENERAL CHARACTER OF THE MAGNETOHYDRODYNAMIC FLOW PAST A NONCONDUCTING FLAT PLATE, IN THE PRESENCE OF TRANSVERSE MAGNETIC FIELDS, IS ANALYZED.
AD-278 682 DIV. 9

A STEADY, INCOMPRESSIBLE, ELECTRICALLY CONDUCTING, LAMINAR BOUNDARY LAYER OVER A SEMI-INFINITE FLAT PLATE IS TREATED.
AD-278 694 DIV. 9

*MAGNETOHYDRODYNAMICS
PROPULSION

A LITERATURE SURVEY OF THE THREE TYPES OF MAGNETOHYDRODYNAMIC PROPULSORS (SHUNT, SERIES AND INDUCTION) AND A THEORY FOR ANALYZING PERFORMANCE OF J X B ACCELERATOR. MAXIMUM PROPULSION EFFICIENCY IS USED TO DETERMINE PERFORMANCE OF WORKING FLUIDS.
AD-278 837 DIV. 9

*MAINTENANCE
DATA PROCESSING SYSTEMS

INTEGRATED SYSTEM OF MODULAR TEST EQUIPMENT TO PROVIDE A CAPABILITY FOR AUTOMATIC FIELD MAINTENANCE TESTING.
AD-278 638 DIV. 30

*MAINTENANCE
DESIGN

SOME PROCEDURES IN DESIGN FOR MAINTAINABILITY: SUGGESTED PROCEDURES FOR INCLUDING MAINTENANCE DESIGN CONSIDERATIONS IN ADVANCED SYSTEMS ANALYSIS AND CONCEPTUAL DESIGN: TYPES OF MAINTENANCE DESIGN REQUIREMENTS AND SPECIFICATIONS: PURPOSES THEY SERVE.
AD-278 804 DIV. 12

*MANAGEMENT ENGINEERING
SUPPLIES

A DISCUSSION IS PRESENTED ON HOW STATISTICAL AGGREGATES MAY BE USED BOTH TO IMPROVE INVENTORY MANAGEMENT AND EVALUATE CONTROL SCHEMES BASED ON SUCH USE.
AD-278 671 DIV. 26

*MANGANESE COMPOUNDS

THERMODYNAMIC THEORY PERMITS PREDICTION OF THE MODE OF VAPORIZATION OF TRANSITION ELEMENT SULPHIDES. MNS IS THE ONLY CLEAR CASE WHERE A GASEOUS SULPHIDE MOLECULE HAS APPRECIABLE CONCENTRATION IN SATURATED VAPOR. THIS WAS CONFIRMED BY MASS SPECTROSCOPY WHICH GAVE THE DISSOCIATION ENERGY VALUE 65 5 KCAL/MOLE.
AD-278 829 DIV. 25

*MANUFACTURING METHODS

CERAMIC FORMULATIONS FOR USE IN CAPACITORS. STATUS OF SPRAYING CAPABILITY, AND PRECOATING CERAMIC POWDER.
AD-278 722 DIV. 7

VAPOR-DEPOSITED SILICON ELEMENTS AND DIFFUSED SILICON ELEMENTS. IMPROVEMENT OF OHMIC CONTACTS, SHEET RESISTIVITY AND METHODS OF ADJUSTMENT.
AD-278 729 DIV. 8

DESIGN AND DEVELOPMENT OF SOLID ELECTROLYTE TANTALUM CAPACITORS: ONE CAPABLE OF OPERATION AT 100 VOLTS AT 85 C: THE OTHER AT 20 VOLTS AT 85 C.
AD-278 820 DIV. 8

*MARS

ABSTRACTS OF PUBLISHED SOVIET PAPERS ON THE ATMOSPHERES OF MARS AND VENUS AND THE LUNAR SURFACE.
AD-278 628 DIV. 2

*MATHEMATICAL ANALYSIS

AN ENGINEERING ANALYSIS OF CARGO HANDLING. A DETERMINISTIC PRODUCTIVITY MODEL OF MATERIALS HANDLING SYSTEMS.
AD-278 549 DIV. 33

*MATHEMATICAL PREDICTION
PRODUCTION

AN ENGINEERING ANALYSIS OF CARGO HANDLING. A DETERMINISTIC PRODUCTIVITY MODEL OF MATERIALS HANDLING SYSTEMS.
AD-278 549 DIV. 33

*MATRIX ALGEBRA

SUCCESSIVE PARTITIONING TECHNIQUE FOR SOLUTION OF SECULAR EQUATIONS.
AD-278 501 DIV. 15

A PERTURBATION METHOD FOR THE ONE-ELECTRON DENSITY MATRIX OF THE HARTREE-FOCK APPROXIMATION.
AD-278 502 DIV. 15

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AD-278 504 DIV. 15

A LEAST-SQUARES METHOD FOR COMPUTING THE GENERALIZED INVERSE OF AN ARBITRARY COMPLEX MATRIX.
AD-278 516 DIV. 15

A SET OF MATRICES FOR TESTING COMPUTER PROGRAMS IS DEVELOPED AND THE COMPLETE SOLUTION OF EACH MATRIX IS GIVEN.
AD-278 733 DIV. 30

*MEMORY DEVICES

CIRCUIT TECHNIQUES AND MEMORY DEVICES FOR IMPLEMENTING A SUBMICROSECOND SIMULATION COMPUTER ARE DISCUSSED.
AD-278 848 DIV. 30

*MERCURY

RUBBER TUBE AS INSULATION IMPROVED THE TIME COURSE COMPENSATION WITH ABRUPT TEMPERATURE CHANGES WHEN USED IN THE MEASUREMENT OF THE PERIPHERAL BLOOD FLOW IN DIGITAL PLETHYSMOGRAPHY.
AD-278 523 DIV. 16

***OSCILLATION**

CONSIDERS THE EXTENSION ON NON-LINEAR SYSTEMS TO OTHER THAN MEAN-SQUARE-ERROR APPLICATIONS AND THE DEVELOPMENT OF A PROCEDURE FOR THE EXPERIMENTAL DETERMINATION OF HIGH ORDER CORRELATION FUNCTIONS WITHOUT THE USE OF DELAY LINES.
AD-278 691 DIV. 15

***OXIDATION**

RESEARCH ON THE BEHAVIOR OF METALLIC CRYSTALS INCLUDED THE FOLLOWING STUDIES: CONTROLLED OXIDATION OF CD SINGLE- AND BI-CRYSTALS. DECORATION OF CD BI-CRYSTALS BY VAPOR DEPOSITION OF CD. DECORATION MECHANISM OF ZN ON CD SINGLE- AND BI-CRYSTALS. CONTROLLED REDUCTION OF HEMATITE CRYSTALS.
AD-278 481 DIV. 4

KINETICS OF OXIDATION OF MO AND MO SILICIDES WAS STUDIED BY UTILIZING A THERMAL CONDUCTIVITY BRIDGE AT TEMPERATURES BETWEEN 1000 AND 1725 C.
AD-278 826 DIV. 17

***OXIDATION INHIBITORS**

EVALUATION TESTS OF 7 OXIDATION PROTECTIVE COATINGS APPLIED TO FS-85 AND D-14 ALLOYS. TEMPERATURE RANGES WERE FROM 1600 TO 2600 F. AND AT 2000 AND 2600 F AFTER ROOM TEMPERATURE PRESTRAIN IN BOTH ELASTIC AND PLASTIC REGIONS.
AD-278 727 DIV. 14

***OXIDES**
CHEMICAL REACTIONS

VAPOR PRESSURES IN THE LIQUID SYSTEM RB2O-B2O3. MEASUREMENT BY TRANSPIRATION METHOD. DERIVED THERMODYNAMIC DATA AND A STRUCTURAL INTERPRETATION.
AD-278 573 DIV. 4

***OXIDES**
ELECTRICAL PROPERTIES

ELECTRICAL AND THERMAL PROPERTIES OF OXIDE SEMICONDUCTOR MATERIALS - TITANIUM OXIDES. THERMOELECTRICITY.
AD-278 671 DIV. 14

***OXYGEN CONSUMPTION**

EFFECTS OF TEMPERATURE ON OXYGEN CONSUMPTION AND GENERATION TIMES OF KLEBSIELLA PNEUMONIAE AND STAPHYLOCOCCUS AUREUS SHOWED THAT THE GENERATION TIMES APPEARED TO BE INDEPENDENT OF TEMPERATURE BETWEEN 25 AND 37 C. THEY WERE TEMPERATURE DEPENDENT BELOW 25 C.
AD-278 528 DIV. 16

SION PROBLEMS, AND GENERAL MILITARY DECISION PROBLEMS.
AD-278 664 DIV. 15

*MILITARY PERSONNEL

HUMAN FACTORS PROGRAM TO DETERMINE THE APPROXIMATE CANDLE POWER REQUIREMENTS AND GENERAL USEFULNESS OF A RECENTLY DEVELOPED GROUND FLARE.
AD-278 555 DIV. 3

*MILITARY TRAINING
EFFECTIVENESS

WORK PROGRAM FOR FISCAL YEAR 1963. RESEARCH AND DEVELOPMENT IN TRAINING METHODS, MOTIVATION, LEADERSHIP, AND MAN-WEAPONS SYSTEM ANALYSIS.
AD-278 600 DIV. 28

*MILITARY TRANSPORTATION
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THE ENVIRONMENTAL PROBLEMS AFFECTING TRANSPORTATION SUPPORT IN MILITARY OPERATIONS WERE STUDIED.
AD-278 596 DIV. 33

*MODULATOR TUBES

CONSTRUCTION AND INSTALLATION OF A SUPER-POWER KLYSTRON TUBE-TEST FACILITY.
AD-278 586 DIV. 30

*MOLECTRONICS

HISTORY OF THE MICROELECTRONICS PROGRAM. COMPONENTS FABRICATION TECHNIQUES. OBJECTIVES OF THE BUREAU OF NAVAL WEAPONS MICROELECTRONICS PROGRAM.
AD-278 449 DIV. 8

*MOLECULAR SPECTROSCOPY

RESULTS OF RESEARCH IN LABORATORY ASTROPHYSICS ON THE MOLECULAR EXCITATION GROUP AT THE UNIVERSITY OF WESTERN ONTARIO ARE REVIEWED.
AD-278 511 DIV. 25

*MOLECULES

QUARTERLY PROGRESS REPORT OF THE SOLID-STATE AND MOLECULAR THEORY GROUP, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS.
AD-278 416 DIV. 25

GAMMA IRRADIATION ON FLUOROCARBON POLYMERS AND SMALL MOLECULES. PHYSICAL PROPERTIES; EFFECTS OF O AND CL ATMOSPHERES; RADIATION CHEMISTRY OF PERFLUOROHEPTANE, HEXAFLUOROBENZENE; INDUCED POLYMERIZATION; YIELDS OF RADICALS BY ESR.
AD-278 578 DIV. 20

AN EQUILIBRIUM ENERGY DISTRIBUTION FUNCTION INCLUDING ROTATION IS CONSIDERED FOR A DIATOMIC MOLECULAR GAS WHICH IS FOUND TO BE CONSISTENTLY CORRECT IN GENERATING CONTINUUM EQUATIONS FROM A GENERAL TRANSPORT EQUATION.
AD-278 834 DIV. 9

*MOLYBDENUM
OXIDATION

KINETICS OF OXIDATION OF MO AND MO SILICIDES WAS STUDIED BY UTILIZING A THERMAL CONDUCTIVITY BRIDGE AT TEMPERATURES BETWEEN 1000 AND 1725 C.
AD-278 826 DIV. 17

*MOLYBDENUM ALLOYS

FULL LENGTH T-SHAPE EXTRUSIONS OF MO-TI-ZR-C ALLOY WERE MADE FROM 3200F BILLET HEATING TEMPERATURE WITH A REDUCTION RATIO OF ABOUT 19:1. LINER PRESSURE IN EXCESS OF 200,000 PSI WAS REQUIRED TO ACCOMPLISH THE EXTRUSIONS. SURFACE QUALITY WAS FAIR.
AD-278 634 DIV. 26

*MOLYBDENUM COMPOUNDS

KINETICS OF OXIDATION OF MO AND MO SILICIDES WAS STUDIED BY UTILIZING A THERMAL CONDUCTIVITY BRIDGE AT TEMPERATURES BETWEEN 1000 AND 1725 C.
AD-278 826 DIV. 17

*MOON

ABSTRACTS OF PUBLISHED SOVIET PAPERS ON THE ATMOSPHERES OF MARS AND VENUS AND THE LUNAR SURFACE.
AD-278 628 DIV. 2

*MOTION

SUMMARIZES THE MAIN RESULTS IN KINEMATICS OF ORIENTED MEDIA. KINEMATICS OF ORDINARY CONTINUA, MULTIPLE SPACE TENSORS AND TIME RATES OF TENSORS ARE REVIEWED.
AD-278 706 DIV. 15

*MULTIPLEX TRANSMISSION

TWO UNRELATED SPEECH COMMUNICATION SYSTEMS ARE DESCRIBED WHICH PROVIDE CERTAIN EFFICIENCIES IN SPEECH CHANNEL USAGE.
AD-278 711 DIV. 5

*NAVAL RESEARCH
ELECTRONICS

HISTORY OF THE MICROELECTRONICS PROGRAM. COMPONENTS FABRICATION TECHNIQUES. OBJECTIVES OF THE BUREAU OF NAVAL WEAPONS MICROELECTRONICS PROGRAM.
AD-278 449 DIV. 8

*NEUTRON CAPTURE

ER-172 AND DY-166 WITH HALF-LIVES OF 48.7 PLUS OR MINUS 0.5 HOURS AND 81.3 PLUS OR MINUS 0.2 HOURS WERE PRODUCED BY DOUBLE NEUTRON CAPTURE FORM ER-170 AND DY-164.
AD-278 597 DIV. 20

*NEUTRONS

AN ANALYSIS OF THE CRITICAL PROBLEM OF SPHERES AND SLABS AND NEUTRON PRODUCTION IN A HOMOGENEOUS REACTOR IS STUDIED.
AD-278 477 DIV. 20

*NICKEL

OXIDE BONDING AND THE CREEP-RUPTURE STRENGTH OF NICKEL. MEASUREMENT OF THE STRENGTH OF NICKEL SPECIMENS BONDED BY SINTERED OXIDE LAYERS.
AD-278 576 DIV. 17

*NICKEL ALLOYS
ADDITIVES

IMPROVEMENT OF HIGH-TEMPERATURE PROPERTIES OF FE-CR-NI ALLOYS WESTINGHOUSE W-525 AND UNITEMP 21 ATTAINED BY ADDITIONS OF INCONGRUOUS ELEMENTS B, TI, AL, AND ZR.
AD-278 630 DIV. 17

*NIOBIUM ALLOYS

EVALUATION TESTS OF 7 OXIDATION PROTECTIVE COATINGS APPLIED TO FS-85 AND D-14 ALLOYS. TEMPERATURE RANGES WERE FROM 1600 TO 2600 F, AND AT 2000 AND 2600 F AFTER ROOM TEMPERATURE PRESTRAIN IN BOTH ELASTIC AND PLASTIC REGIONS.
AD-278 727 DIV. 14

PROCESSING METHODS FOR COLUMBIUM ALLOY SHEET. PRODUCTION OF HIGH STRENGTH, FABRICABLE, AND WELDABLE COLUMBIUM ALLOY SHEET.
AD-278 821 DIV. 26

*NIOBIUM COMPOUNDS

PROCESSING VARIABLES AND FABRICATION TECHNIQUES TO BE USED IN THE PRODUCTION OF HARDWARE STRUCTURES MADE OF NIOBIUM BERYLLIDES ARE DISCUSSED. INTERMETALLIC COMPOUNDS OF NBBE12, NB2BE17, NB2BE19, AND TA2BE17 WERE FABRICATED. SINTERING STUDIES WERE MADE OF NB2BE17.
AD-278 807 DIV. 17

*NOISE
AIRCRAFT

STUDY OF THE REACTION OF PEOPLE IN THE VICINITY OF AIR BASES AND IN AIR BASE OFFICES IS PRESENTED FROM THE CONCURRENT SOCIOPSYCHOLOGICAL INTERVIEWS. CONCLUSIONS ARE STATED REGARDING THE APPLICABILITY OF AVAILABLE MEANS FOR PREDICTING REACTION TO NOISE INTRUSION.
AD-278 622 DIV. 25

*NOISE
PHYSIOLOGY

STUDY OF THE REACTION OF PEOPLE IN THE VICINITY OF AIR BASES AND IN AIR BASE OFFICES IS PRESENTED FROM THE CONCURRENT SOCIOPSYCHOLOGICAL INTERVIEWS. CONCLUSIONS ARE STATED REGARDING THE APPLICABILITY OF AVAILABLE MEANS FOR PREDICTING REACTION TO NOISE INTRUSION.
AD-278 622 DIV. 25

SUMMARY AND GENERALIZATION OF KNOWLEDGE ON NOISE SOURCES CHARACTERISTIC OF MILITARY AIRCRAFT, AND PROPAGATION OF SOUND FROM AIRCRAFT TO OBSERVERS IN THE VICINITY OF AIR BASES.
AD-278 625 DIV. 16

*NON-LINEAR DIFFERENTIAL EQUATIONS

THE BOUNDARY VALUE PROBLEM ON AN INFINITE INTERVAL EXISTENCE, UNIQUENESS AND ASYMPTOTIC BEHAVIOR OF BOUNDED SOLUTIONS TO A CLASS OF NON-LINEAR SECOND ORDER DIFFERENTIAL EQUATIONS.
AD-278 583 DIV. 15

*NONLINEAR SYSTEMS

CONSIDERS THE EXTENSION ON NON-LINEAR SYSTEMS TO OTHER THAN MEAN-SQUARE-ERROR APPLICATIONS AND THE DEVELOPMENT OF A PROCEDURE FOR THE EXPERIMENTAL DETERMINATION OF HIGH ORDER CORRELATION FUNCTIONS WITHOUT THE USE OF DELAY LINES.
AD-278 691 DIV. 15

*NUCLEAR REACTIONS

THE SYMMETRY PROPERTIES OF WEAK, ELECTROMAGNETIC, AND STRONG INTERACTIONS OF ELEMENTARY PARTICLES ARE DISCUSSED.
AD-278 435 DIV. 25

*NUCLEAR RESONANCE

THE EXTENT TO WHICH MULTI-PION RESONANCES CAN BE ACCOUNTED FOR IN TERMS OF A SELF-COUPLED PION FIELD, WITHOUT EXPLICIT INTRODUCTION OF A PION-NUCLEON INTERACTION IS EXAMINED. A METHOD IS PROPOSED FOR THE QUANTIZATION SELF-COUPLED BOSON FIELDS.
AD-278 436 DIV. 25

*NUCLEONS

THE SYMMETRY PROPERTIES OF WEAK, ELECTROMAGNETIC, AND STRONG INTERACTIONS OF ELEMENTARY PARTICLES ARE DISCUSSED.
AD-278 435 DIV. 25

*NUMERICAL ANALYSIS

SPONTANEOUS BREAKDOWN OF ELEMENTARY PARTICLE SYMMETRIES.
AD-278 434 DIV. 25

*NUMERICAL METHODS AND PROCEDURES

TABLES TO A PROBABILITY DENSITY FUNCTION THAT IS A REASONABLE APPROXIMATION TO SAMPLING DISTRIBUTIONS FOUND IN SEVERAL MONTE CARLO TRANSPORT CODES.
AD-278 488 DIV. 15

THE DETAILS OF THE NUMERICAL COMPUTATION OF THE SPALDING FUNCTION WHICH OCCURS IN THE THEORY OF HEAT TRANSFER ACROSS TURBULENT BOUNDARY LAYERS ARE DESCRIBED.
AD-278 579 DIV. 9

*OCEAN WAVES

ANALYSIS OF STRUCTURAL DAMAGE FROM THE 1960 TSUNAMI AT HILO, HAWAII.
AD-278 730 DIV. 2

*OCEANS

THE DEEP OCEAN AS AN ENVIRONMENT FOR UNDERSEA STRUCTURES.
AD-278 457 DIV. 2

*ODORS

RANK-ORDER INTERCORRELATION MATRIX WAS COMPUTED FOR 18 PHYSICOCHEMICAL AND 12 SUBJECTIVE ODOR PARAMETERS OVER 30 ODORANTS. MULTIPLE-GROUP FACTOR ANALYSIS AND MULTIPLE-REGRESSION WERE CONDUCTED. CHEMICAL AND SUBJECTIVE DATA ARE AVAILABLE. SIGNIFICANT RELATIONS WERE FOUND FOR RATE OF ADAPTATION AND ENZYME EFFECTS. INSTRUMENTATION FOR A SUPRATHRESHOLD, THRESHOLD INTENSITY COMPARISON STUDY IS DESCRIBED.

*OILS
TESTS

STUDIES OF GEAR LUBRICATION, BEARING LUBRICATION, LUBRICANT OXIDATION, AND IMPACT SENSITIVITY OF MATERIALS IN CONTACT WITH STRONG OXIDIZERS. LUBRICATION RESEARCH AND TEST METHOD DEVELOPMENT FOR AEROSPACE PROPULSION LUBRICANTS.
AD-278 547 DIV. 14

*OLFACTORY THRESHOLDS

RANK-ORDER INTERCORRELATION MATRIX WAS COMPUTED FOR 18 PHYSICOCHEMICAL AND 12 SUBJECTIVE ODOR PARAMETERS OVER 30 ODORANTS. MULTIPLE-GROUP FACTOR ANALYSIS AND MULTIPLE-REGRESSION WERE CONDUCTED. CHEMICAL AND SUBJECTIVE DATA ARE AVAILABLE. SIGNIFICANT RELATIONS WERE FOUND FOR RATE OF ADAPTATION AND ENZYME EFFECTS. INSTRUMENTATION FOR A SUPRATHRESHOLD, THRESHOLD INTENSITY COMPARISON STUDY IS DESCRIBED.

*OPERATIONS RESEARCH

A RELATIONSHIP BETWEEN DENSITY FUNCTIONS.
AD-278 459 DIV. 33

AN ANALYSIS OF CONVEX CONES INVOLVING INEQUALITIES AND CONE FUNCTIONS.
AD-278 460 DIV. 15

APPLICATION OF STOCHASTIC APPROXIMATION METHODS TO SYSTEM OPTIMIZATION.
AD-278 693 DIV. 26

A COMPARISON OF QUEUE DISCIPLINES WHEN SERVICE ORIENTATION TIMES OCCUR.
AD-278 721 DIV. 26

*OPTICAL SYSTEMS

THERMAL RADIATION GUIDES FOR TRANSMISSION OF POWER FROM SOLAR REFLECTORS.
AD-278 658 DIV. 25

*POWER SUPPLIES
SATELLITE VEHICLES

CYCLE-LIFE TESTS HAVE BEEN CONDUCTED ON ONE TYPE OF 12 AMPERE-HR, SEALED NI-CD CELLS IN 4 TEMPERATURE ENVIRONMENTS AND IN FOUR DEPTHS OF DISCHARGE. IN GROUPS OF 10 CELLS AND IN BATTERIES OF 20 CELLS. CYCLE LIFE IS REDUCED BY HIGH AND LOW AMBIENT TEMPERATURE.
AD-278 647 DIV. 7

*POWER SUPPLIES
SPACESHIPS

LOW TEMPERATURE, PLASMA, VAPOR-FILLED, THERMIONIC CONVERTER WHICH USES A THIRD ELECTRODE TO IONIZE PLASMA AND NEUTRALIZE THE SPACE CHARGE FOR USE AS A RELIABLE SPACE VEHICLE POWER SUPPLY.
AD-278 810 DIV. 7

*PRESSURE TANKS

THE LEAST WEIGHT PROPORTIONS OF HEAD CLOSURES (DOMES) FOR LONG CYLINDRICAL PRESSURE VESSELS ARE DERIVED.
AD-278 486 DIV. 9

*PRESSURE VESSELS

EVALUATION OF 18-7-5 (INCO 250 KSI) AND 18-9-5 (INCO 300 KSI) NICOMO MAR-AGING STEELS LED TO THE SELECTION OF THE LATTER FOR APPLICATION IN PRESSURE VESSELS REQUIRING MATERIAL STRENGTHS IN EXCESS OF 250,000 PSI. BASIC WELDABILITY CHARACTERISTICS WERE EXCELLENT.
AD-278 710 DIV. 17

*PRINTED CIRCUITS
BIBLIOGRAPHY

AN ANNOTATED BIBLIOGRAPHY OF PRINTED CIRCUITS AND WELDED MODULES. MICROMINIATURIZATION OF CIRCUITS AND COMPONENTS FROM A MANUFACTURING RESEARCH VIEWPOINT. DESIGN STANDARDS AND PROCEDURES, PRODUCTION METHODS AND TECHNIQUES, AND APPLICATIONS. CONTINUATION OF AD-271 035, TO END OF 1961.
AD-278 631 DIV. 8

*PROBABILITY

MICROWAVE INTERFEROMETRY IS ADOPTED TO MEASURE THE EFFECTIVE COLLISION CROSS SECTION FOR MOMENTUM TRANSFER OF THERMAL ELECTRONS WITH CESIUM ATOMS IN THE AFTERGLOW OF PURE CESIUM AND HELIUM-CESIUM DISCHARGES.
AD-278 563 DIV. 25

THE DISTRIBUTION OF THE TWO-SAMPLE CRAMER-VON MISES CRITERION FOR SMALL EQUAL SAMPLES IS TREATED.
AD-278 501 DIV. 15

FINITE SEQUENCES OF OBSERVATION, Y1, Y2, ...YT ARE TREATED WHICH ARE REAL-VALUED MEASUREMENTS ON SOME QUANTITY AT T SUCCESSIVE EQUALLY SPACED POINTS IN TIME.
AD-278 648 DIV. 15

AN ANALYSIS IS PRESENTED OF A SINGLE TIME SERIES, I.E. ONE IN WHICH ONE TYPE OF MEASUREMENT IS MADE REPEATEDLY ON THE SAME OBJECT OR INDIVIDUAL.
AD-278 649 DIV. 15

A COMPARISON OF QUEUE DISCIPLINES WHEN SERVICE ORIENTATION TIMES OCCUR.
AD-278 721 DIV. 26

*PROCESSING

THE ROLE OF STRAIN ON THE MECHANICAL PROPERTIES OF H-11 STEEL. STRAIN EFFECTS ON THE RETAINED AUSTENITE AND STRAIN EFFECTS AND SUBSEQUENT AGING ON THE TEMPERED MARTENSITE. ELECTRON MICROSCOPY FOR SELECTED CONDITIONS OF HEAT TREATMENT.
AD-278 847 DIV. 17

*PROGRAMMING

A SET OF MATRICES FOR TESTING COMPUTER PROGRAMS IS DEVELOPED AND THE COMPLETE SOLUTION OF EACH MATRIX IS GIVEN.
AD-278 733 DIV. 30

A VARIABLE INFORMATION PROCESSING SYSTEM (VIP) FOR THE STORAGE AND RETRIEVAL OF MISSILE DATA IS DESCRIBED.
AD-278 835 DIV. 30

*PROPAGATION

THE COMPENSATION THEOREM IS APPLIED TO THE PROBLEM OF THE SKY-WAVE FIELD FROM A VERTICAL, ELECTRIC DIPOLE PLACED ON AN INHOMOGENEOUS, FLAT EARTH CONSISTING OF TWO MEDIA, ONE PERFECTLY CONDUCTING AND ONE HAVING A FINITE CONDUCTIVITY.
AD-278 500 DIV. 8

*PROPELLANT GRAINS

A RESEARCH STUDY TO ADVANCE THE STATE-OF-THE-ART OF SOLID PROPELLANT GRAIN DESIGN.
AD-278 732 DIV. 10

*PSYCHOACOUSTICS

TWO UNRELATED SPEECH COMMUNICATION SYSTEMS ARE DESCRIBED WHICH PROVIDE CERTAIN EFFICIENCIES IN SPEECH CHANNEL USAGE.
AD-278 711 DIV. 5

*PUBLIC OPINION

STUDY OF THE REACTION OF PEOPLE IN THE VICINITY OF AIR BASES AND IN AIR BASE OFFICES IS PRESENTED FROM THE CONCURRENT SOCIOPSYCHOLOGICAL INTERVIEWS CONCLUSIONS ARE STATED REGARDING THE APPLICABILITY OF AVAILABLE MEANS FOR PREDICTING REACTION TO NOISE INTRUSION.
AD-278 622 DIV. 25

*PULLEYS

THE THOMSON AND DIRICHLET PRINCIPLES OF ELECTROSTATICS WERE APPLIED TO THE EVALUATION OF ELECTRON INTERACTION TERMS OCCURRING IN MOLECULAR ENERGY CALCULATIONS.
AD-278 445 DIV. 25

*PULSE MODULATION

A SYSTEM FOR THE AVERAGING AND ANALYSIS OF REPEATED EEG SIGNALS EMPLOYING A CLOSED-LOOP MAGNETIC TAPE AND PULSE-INTERVAL MODULATION.
AD-278 390 DIV. 8

*QUANTUM MECHANICS

SPONTANEOUS BREAKDOWN OF ELEMENTARY PARTICLE SYMMETRIES.
AD-278 434 DIV. 25

THE EXTENT TO WHICH MULTI-PION RESONANCES CAN BE ACCOUNTED FOR IN TERMS OF A SELF-COUPLED PION FIELD, WITHOUT EXPLICIT INTRODUCTION OF A PION-NUCLEON INTERACTION IS EXAMINED. A METHOD IS PROPOSED FOR THE QUANTIZATION SELF-COUPLED BOSON FIELDS.
AD-278 436 DIV. 25

A PERTURBATION METHOD FOR THE ONE-ELECTRON DENSITY MATRIX OF THE HARTREE-FOCK APPROXIMATION.
AD-278 502 DIV. 15

THE STABILITY OF HARTREE-FOCK STATES.
AD-278 504 DIV. 15

*QUANTUM MECHANICS
HYDROGEN

THE QUANTUM MECHANICAL INTERPRETATION OF THE STARK EFFECT IN THE H ATOM IS DISCUSSED. A PLAUSIBLE MODIFICATION OF THE BOUNDARY CONDITIONS MAKES THE POWER SERIES CONVERGENT FOR AT LEAST THOSE STATES ASSOCIATED WITH THE PRINCIPAL QUANTUM NOS, N = 1, 2, 3, 4 UP TO 100,000 VOLT/CM.
AD-278 505 DIV. 25

*RADAR
OPTICAL SYSTEMS

PROBLEMS OF AN OPTICAL RADAR SYSTEM, USEFULNESS OF COMMERCIALLY AVAILABLE LASERS FOR SUCH A SYSTEM, AND SOLID STATE RESEARCH PROVIDING NEW MATERIALS FOR LASER-TYPE DEVICES.
AD-278 640 DIV. 6

*RADAR DECOYS
IDENTIFICATION

APPLICATION OF RECOGNITION THEORY TO MISSILE IDENTIFICATION AND DECOY DISCRIMINATION, VOLUME 2, THEORETICAL AND COMPUTATIONAL ASPECTS OF THE MAIN PROBLEM.
AD-278 687 DIV. 12

*RADAR ECHO AREAS

ANGULAR DENSITY AND RANGE DISTRIBUTION OF RADAR ECHOES FROM METEOR TRAILS. IN THE CASE OF UNIFORM DISTRIBUTION OF GEOCENTRIC RADIANTS.
AD-278 812 DIV. 2

THE VOLUME DENSITY OF RADAR ECHOES FROM METEOR TRAILS IN TWO PARTICULAR CASES OF HELIOCENTRIC RADIANT DISTRIBUTION.
AD-278 814 DIV. 2

*RADAR INTERCEPTION

DESIGN, FABRICATION, AND TESTING OF THE AN/TLA-9, DIRECTION FINDER GROUP WHICH IS A RAPID SCAN MICROWAVE DF SYSTEM FOR INTERCEPTION AND AZIMUTH BEARING FINDING OF SIGNALS FROM 1 TO 10.75 KMC.
AD-278 679 DIV. 6

*RADAR JAMMING

THE DEVELOPMENT OF A CONDITIONED-REFLEX SYSTEM FOR USE IN AUTOMATIC ECM MODE SELECTION IS DISCUSSED.
AD-278 494 DIV. 30

*RADAR SCANNING
SATELLITE VEHICLES

DESIGN CONCEPT OF THE CONTROL AND COMPUTATION EQUIPMENT FOR A SPADATS PHASED ARRAY RADAR.
AD-278 483 DIV. 6

*RADAR SIGNALS

THE DEVELOPMENT OF A CONDITIONED-REFLEX SYSTEM FOR USE IN AUTOMATIC ECM MODE SELECTION IS DISCUSSED.
AD-278 494 DIV. 30

*RADAR TRACKING
SATELLITE VEHICLES

DESIGN CONCEPT OF THE CONTROL AND COMPUTATION EQUIPMENT FOR A SPADATS PHASED ARRAY RADAR.
AD-278 483 DIV. 6

*RADIATION COUNTERS

APPLICATION OF A RELIABILITY PREDICTION TO A NAVY RADIAC.
AD-278 614 DIV. 20

*RADIATION DAMAGE
PLASTICS

REACTOR RADIATION EFFECTS ON THE ENGINEERING PROPERTIES OF ELASTOMERS AND PLASTICS AT VARIOUS TEMPERATURES IN SEVERAL MEDIA, INCLUDING AIR, HELIUM JP4 FUEL, ORONITE, MIL 7808, AND MIXED 4P3E.
AD-278 818 DIV. 20

*RADIATION EFFECTS
COAXIAL CABLES

AN ANNOTATED BIBLIOGRAPHY OF RADIATION EFFECTS ON COAXIAL CABLES AND ELECTRIC INSULATION MATERIALS TO FEBRUARY 1962.
AD-278 674 DIV. 20

*RADIATION EFFECTS
PLASTICS

REACTOR RADIATION EFFECTS ON THE ENGINEERING PROPERTIES OF ELASTOMERS AND PLASTICS AT VARIOUS TEMPERATURES IN SEVERAL MEDIA, INCLUDING AIR, HELIUM JP4 FUEL, ORONITE, MIL 7808, AND MIXED 4P3E.
AD-278 818 DIV. 20

*RADIO COMMUNICATION SYSTEMS

TWO UNRELATED SPEECH COMMUNICATION SYSTEMS ARE DESCRIBED WHICH PROVIDE CERTAIN EFFICIENCIES IN SPEECH CHANNEL USAGE.
AD-278 711 DIV. 5

*RADIO INTERCEPTION

APPLICATION OF NEW SENSOR AND DATA PROCESSING TECHNIQUES FOR RECOGNITION OF NON-COOPERATIVE AEROSPACE VEHICLES, SENSORS CHOSEN ARE GROUND BASED RF SIGNAL INTERCEPTOR AND IR-VISUAL APPEARANCE-BEHAVIOR SENSOR.
AD-278 566 DIV. 12

DESIGN, FABRICATION, AND TESTING OF THE AN/TLA-9, DIRECTION FINDER GROUP WHICH IS A RAPID SCAN MICROWAVE DF SYSTEM FOR INTERCEPTION AND AZIMUTH BEARING FINDING OF SIGNALS FROM 1 TO 10.75 KMC.
AD-278 679 DIV. 6

*RADIO INTERFERENCE

AN ANNOTATED BIBLIOGRAPHY OF R-F BLACKOUT PHENOMENA, THEORETICAL AND EXPERIMENTAL STUDIES OF CAUSES AND POSSIBLE SOLUTIONS TO THE PROBLEM, 1959 - FEBRUARY 1962.
AD-278 678 DIV. 8

*RADIO INTERFERENCE
REDUCTION

PERFORMANCE OF 2 HIGH POWER, NARROW-BAND-PASS, TRANSMITTER-OUTPUT FILTERS, ARE CENTERED AT 10 MC AND THE OTHER AT 300 MC. INSERTION LOSS IN THE STOP BANDS.
AD-278 715 DIV. 8

*RADIO RECEPTION

METHOD FOR OBTAINING COMPLETE OR PARTIAL INFORMATION CONCERNING THE LOCATION OF AN HF RADIO TRANSMITTER AT ONE RECEIVING STATION BY OBSERVATION OF THE FLUCTUATION OF CARRIER LEVEL OF AM SIGNALS, EMPHASIS IS ON IONOSPHERICALLY PROPAGATED SIGNALS USING A STATISTICAL APPROACH.
AD-278 705 DIV. 8

*RADIO SIGNALS
ATTENUATION

METHOD FOR OBTAINING COMPLETE OR PARTIAL INFORMATION CONCERNING THE LOCATION OF AN HF RADIO TRANSMITTER AT ONE RECEIVING STATION BY OBSERVATION OF THE FLUCTUATION OF CARRIER LEVEL OF AM SIGNALS, EMPHASIS IS ON IONOSPHERICALLY PROPAGATED SIGNALS USING A STATISTICAL APPROACH.
AD-278 705 DIV. 8

***PACKAGED CIRCUITS**
DIGITAL COMPUTERS

APPLICATION OF MICROELECTRONICS IN AIRBORNE ELECTRONIC EQUIPMENT: TEST RESULTS: APPLICATION: R AND D: AVAILABILITY: STANDARDIZATION.
AD-278 699 DIV. 8

***PARABOLIC ANTENNAS**

DESIGN, FABRICATION, AND TESTING OF THE AN/TLA-9, DIRECTION FINDER GROUP WHICH IS A RAPID SCAN MICROWAVE OF SYSTEM FOR INTERCEPTION AND AZIMUTH BEARING FINDING OF SIGNALS FROM 1 TO 10.75 KMC.
AD-278 679 DIV. 6

***PARAMAGNETIC CRYSTALS**

NUCLEAR RESONANCE STUDIES INCLUDED THE NUCLEAR MAGNETIC RESONANCE OF AL IN RUBY AND LICL AND LIF CONTAINING MN ION IMPURITIES. ELECTRON PARAMAGNETIC RESONANCE STUDIES INDICATED THAT THE MN ION EXISTED IN A DILUTE AND CONCENTRATED PHASE IN LICL: IN LIF THIS TENDENCY DID NOT OCCUR UP TO 10 MOLE-% MN ION.
AD-278 629 DIV. 25

***PARITY**

THE SYMMETRY PROPERTIES OF WEAK, ELECTROMAGNETIC, AND STRONG INTERACTIONS OF ELEMENTARY PARTICLES ARE DISCUSSED.
AD-278 439 DIV. 25

***PARTICLES**

THE VISCO-PLASTIC EQUATIONS GOVERNING THE AXISYMMETRIC IMPACT SITUATION ARE REFORMULATED IN A FORM APPROPRIATE TO THE PARTICLE-IN-CELL METHOD OF CALCULATION.
AD-278 662 DIV. 25

***PARTICLES**
VELOCITY

CALIBRATION OOF A MAFTEX MEDIUM FOR ESTIMATING PARTICLE VELOCITY OVER A BROAD RANGE OF PARTICLE SIZES, VELOCITIES, MATERIALS (PLASTICS, MG ALLOY, AL ALLOY, STEEL, AND B ALLOY), AND OBLIQUITIES OF IMPACT.
AD-278 545 DIV. 22

***PENTABORANES**

THE SYNTHESIS AND ISOLATION OF LESSER KNOWN OR UNKNOWN BORANES: A HIGH PRESSURE REACTIOON OF DIBORANE WITH PENTABORANE-11 PRODUCED NONABORANE-15. NONABORANE-15 DECONPOSED AT LOW PRESSURE TO OCTABORANE AND HEXABORANE-10. DECABORANE-14 WAS ALSO FORMED.
AD-278 450 DIV. 4

***PERCEPTION**
HUMAN ENGINEERING

HUMAN PATTERN RECOGNITION PROCEDURES AS RELATED TO MILITARY RECOGNITION PROBLEMS.
AD-278 540 DIV. 28

***PERMAFROST**

BIBLIOGRAPHY ON SNOW, ICE, AND PERMAFROST WITH ABSTRACTS.
AD-278 593 DIV. 2

***PERTURBATION THEORY**

A PERTURBATION METHOD FOR THE ONE-ELECTRON DENSITY MATRIX OF THE HARTREE-FOCK APPROXIMATION.
AD-278 502 DIV. 15

PONTECOULANT'S SOLUTION OF THE THREE-BODY PROBLEM OF THE LUNAR THEORY IS APPLIED TO THE MOTION OF A LUNAR SATELLITE PERTURBED BY THE EARTH TO OBTAIN AN ESTIMATE OF THE CHANGES CAUSED IN THE RADIAL COORDINATE.
AD-278 709 DIV. 12

***PHENYL RADICALS**

SYNTHESIS OF DIPHENYLPHOSPHINODECABORANE FROM THE REACTION OF DECABORANYL SODIUM AND DIPHENYLPHOSPHINODECABORANE. CHEMICAL REACTIONS WITH LEWIS ACIDS, ALCOHOLS, AND AMINES.
AD-278 702 DIV. 4

***PHOSPHINES**

SYNTHESIS, PYROLYSIS AND THERMAL STABILITY OF DECABORANE-PHOSPHINE POLYMERS.
AD-278 701 DIV. 4

SYNTHESIS OF DIPHENYLPHOSPHINODECABORANE FROM THE REACTION OF DECABORANYL SODIUM AND DIPHENYLPHOSPHINODECABORANE. CHEMICAL REACTIONS WITH LEWIS ACIDS, ALCOHOLS, AND AMINES.
AD-278 702 DIV. 4

***PHOSPHORUS COMPOUNDS**

SYNTHESIS, PYROLYSIS AND THERMAL STABILITY OF DECABORANE-PHOSPHINE POLYMERS.
AD-278 701 DIV. 4

SYNTHESIS OF DIPHENYLPHOSPHINODECABORANE FROM THE REACTION OF DECABORANYL SODIUM AND DIPHENYLPHOSPHINODECABORANE. CHEMICAL REACTIONS WITH LEWIS ACIDS, ALCOHOLS, AND AMINES.
AD-278 702 DIV. 4

***PHOTO INTERPRETATION**
HANDBOOKS

THE MANUAL IS DESIGNED AS AN AID TO RAPID IDENTIFICATION AND ANALYSIS OF MILITARY TARGETS ON LOW IMAGE-QUALITY NON-STEREOSCOPIC AERIAL PHOTOGRAPHY OBTAINED FROM VERY HIGH ALTITUDES.
AD-278 620 DIV. 24

***PHOTOGRAPHIC ANALYSIS**

APPLICATION OF NEW SENSOR AND DATA PROCESSING TECHNIQUES FOR RECOGNITION OF NON-COOPERATIVE AEROSPACE VEHICLES: SENSORS CHOSEN ARE GROUND BASED RF SIGNAL INTERCEPTOR AND IR-VISUAL APPEARANCE-BEHAVIOR SENSOR.
AD-278 566 DIV. 12

***PHOTONS**

PHOTOMESON PRODUCTION FROM NEUTRONS BOUND IN HELIUM AND DEUTERIUM WAS INVESTIGATED BY SIMULTANEOUSLY MEASURING THE ANGLE AND ENERGY OF THE MESON AND THE RECOIL PROTON.
AD-278 413 DIV. 20

***PHOTONUCLEAR REACTIONS**

PHOTOMESON PRODUCTION FROM NEUTRONS BOUND IN HELIUM AND DEUTERIUM WAS INVESTIGATED BY SIMULTANEOUSLY MEASURING THE ANGLE AND ENERGY OF THE MESON AND THE RECOIL PROTON.
AD-278 413 DIV. 20

***PIONS**

PHOTOMESON PRODUCTION FROM NEUTRONS BOUND IN HELIUM AND DEUTERIUM WAS INVESTIGATED BY SIMULTANEOUSLY MEASURING THE ANGLE AND ENERGY OF THE MESON AND THE RECOIL PROTON.
AD-278 413 DIV. 20

THE EXTENT TO WHICH MULTI-PION RESONANCES CAN BE ACCOUNTED FOR IN TERMS OF A SELF-COUPLED PION FIELD, WITHOUT EXPLICIT INTRODUCTION OF A PION-NUCLEON INTERACTION IS EXAMINED. A METHOD IS PROPOSED FOR THE QUANTIZATION SELF-COUPLED BOSON FIELDS.
AD-278 436 DIV. 25

***PLASMA JETS**

GENERATION AND MEASUREMENT OF PLASMOIDS.
AD-278 601 DIV. 25

***PLASMA PHYSICS**

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

THERMODYNAMICS AND TRANSPORT PROCESSES IN MULTICOMPONENT SYSTEMS.
AD-278 571 DIV. 8

LOW TEMPERATURE, PLASMA, VAPOR-FILLED, THERMIONIC CONVERTER WHICH USES A THIRD ELECTRODE TO IONIZE PLASMA AND NEUTRALIZE THE SPACE CHARGE FOR USE AS A RELIABLE SPACE VEHICLE POWER SUPPLY.
AD-278 810 DIV. 7

***PLASTIC COATINGS**

INVESTIGATION OF ELECTRODEPOSITION METHODS FOR APPLYING THIN TEFLON COATINGS TO STEEL SUBSTRATES. THE FILMS ARE TO SERVE AS DRY LUBRICANTS AND PRESERVATIVE COATINGS.
AD-278 562 DIV. 14

***PLASTIC FLOW**

STUDY OF THE PLASTIC DEFORMATION OF METALS BY OBSERVATION OF SINGLE DISLOCATIONS. DATA ON DISLOCATIONS IN ALPHA-BRASS BY A DECORATION-ETCH PIT TECHNIQUE, BY TRANSMISSION ELECTRON MICROSCOPY AND BY MECHANICAL MEASUREMENT OF THE FRICTIONAL STRESS ACTING ON GLIDE DISLOCATIONS.
AD-278 554 DIV. 17

***PLASTICITY**

THE SETTLEMENTS AND TILTING OF FOOTINGS ON COMPACTED SNOW AND CERTAIN FROZEN GROUNDS ARE TREATED. SUCH FOUNDATIONS SHOW LARGE CREEP DEFORMATIONS WHEN SUBJECTED TO LOADS OF LONG DURATION.
AD-278 533 DIV. 25

THE VISCO-PLASTIC EQUATIONS GOVERNING THE AXISYMMETRIC IMPACT SITUATION ARE REFORMULATED IN A FORM APPROPRIATE TO THE PARTICLE-IN-CELL METHOD OF CALCULATION.
AD-278 662 DIV. 25

***PLASTICS**
RADIATION DAMAGE

REACTOR RADIATION EFFECTS ON THE ENGINEERING PROPERTIES OF ELASTOMERS AND PLASTICS AT VARIOUS TEMPERATURES IN SEVERAL MEDIA, INCLUDING AIR, HELIUM JP4 FUEL, ORONITE, MIL 7808, AND MIXED HPJF.
AD-278 818 DIV. 20

***POLARISCOPES**

THERMAL RADIATION GUIDES FOR TRANSMISSION OF POWER FROM SOLAR REFLECTORS.
AD-278 658 DIV. 25

***POLARIZATION**

THE THEORETICAL SCATTERING PROPERTIES OF POLYDISPERSED SUSPENSIONS SUCH AS NATURAL HAZES AND CLOUDS IN THE ATMOSPHERE ARE TREATED.
AD-278 489 DIV. 25

TRANSMISSION, SCATTERING, AND POLARIZATION OF OPTICAL RADIATION IN ATMOSPHERIC AEROSOLS.
AD-278 685 DIV. 2

***POLYMERIZATION**

AN INVESTIGATION IS BEING MADE OF RADIATION-INDUCED POLYMERIZATION OF ACETYLENIC DERIVATIVES FOR THE PURPOSE OF PREPARING THERMALLY STABLE, HIGH POLYMER SEMICONDUCTING MATERIALS. EIGHTEEN ACETYLENES WERE RADIOLYZED: G VALUES FOR MONOMER DISAPPEARANCE VARIED FROM 10 TO 200.
AD-278 619 DIV. 20

***POLYMERS**

AN INVESTIGATION IS BEING MADE OF RADIATION-INDUCED POLYMERIZATION OF ACETYLENIC DERIVATIVES FOR THE PURPOSE OF PREPARING THERMALLY STABLE, HIGH POLYMER SEMICONDUCTING MATERIALS. EIGHTEEN ACETYLENES WERE RADIOLYZED: G VALUES FOR MONOMER DISAPPEARANCE VARIED FROM 10 TO 200.
AD-278 619 DIV. 20

***POLYMERS**
ELECTRODEPOSITION

INVESTIGATION OF ELECTRODEPOSITION METHODS FOR APPLYING THIN TEFLON COATINGS TO STEEL SUBSTRATES. THE FILMS ARE TO SERVE AS DRY LUBRICANTS AND PRESERVATIVE COATINGS.
AD-278 562 DIV. 14

***POLYMERS**
RADIATION EFFECTS

GAMMA IRRADIATION ON FLUOROCARBON POLYMERS AND SMALL MOLECULES. PHYSICAL PROPERTIES: EFFECTS OF O AND CL ATMOSPHERES: RADIATION CHEMISTRY OF PERFLUOROHEPTANE, HEXAFLUOROBENZENE: INDUCED POLYMERIZATION: YIELDS OF RADICALS BY ESR.
AD-278 578 DIV. 20

***POLYMERS**
SYNTHESIS

SUBSTITUTION-ADDITION REACTIONS OF EXCESS BERYLLIUM(II) AND CHROMIUM(III) ACETYLACETONATES WITH DIPHENYLPHOSPHINIC ACID CARRIED OUT IN MELTS YIELD THE DIMERS, (BE(C5H702)(OP(C6H5)2O))2 AND (CR(C5H702)2(OP(C6H5)2O))2. THE DIPHENYLPHOSPHINATE ANION ACTS AS A CATENATING GROUP: CYCLIC OLIGOMERS FORMED IN PREFERENCE TO LINEAR POLYMERS.
AD-278 462 DIV. 4

SYNTHESIS, PYROLYSIS AND THERMAL STABILITY OF DECABORANE-PHOSPHINE POLYMERS.
AD-278 701 DIV. 4

***POLYNOMIALS**

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AD-278 490 DIV. 15

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AD-278 705 DIV. 8

***POWER SUPPLIES**

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AD-278 816 DIV. 7

OF NICKEL. MEASUREMENT OF THE STRENGTH OF NICKEL SPECIMENS BONDED BY SINTERED OXIDE LAYERS.
AD-278 574 DIV. 17

*SATELLITE VEHICLES

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AD-278 483 DIV. 6

*SATELLITE VEHICLES
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APPLICATION OF NEW SENSOR AND DATA PROCESSING TECHNIQUES FOR RECOGNITION OF NON-COOPERATIVE AEROSPACE VEHICLES; SENSORS CHOSEN ARE GROUND BASED RF SIGNAL INTERCEPTOR AND IR-VISUAL APPEARANCE-BEHAVIOR SENSOR.
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*SATELLITE VEHICLES
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AD-278 713 DIV. 8

*SCATTERING

AN ANALYSIS OF THE CRITICAL PROBLEM OF SPHERES AND SLABS AND NEUTRON PRODUCTION IN A HOMOGENEOUS REACTOR IS STUDIED.
AD-278 477 DIV. 20

THE THEORETICAL SCATTERING PROPERTIES OF POLYDISPERSED SUSPENSIONS SUCH AS NATURAL HAZES AND CLOUDS IN THE ATMOSPHERE ARE TREATED.
AD-278 489 DIV. 25

PREPARATIONS FOR A STUDY OF GEOMAGNETIC-FIELD-ALIGNED UHF SCATTER.
AD-278 495 DIV. 8

TRANSMISSION, SCATTERING, AND POLARIZATION OF OPTICAL RADIATION IN ATMOSPHERIC AEROSOLS.
AD-278 685 DIV. 2

THE MULTIPLE SCATTERING OF PLANE WAVES BY TWO IDENTICAL INFINITE, WIDELY SPACED, PARALLEL ELLIPTIC CYLINDERS IS TREATED. THE MAJOR AXES ARE CONSIDERED AS PARALLEL AND THE MINOR AXES CO-LINEAR AND VICE-VERSA.
AD-278 745 DIV. 8

*SCIENTIFIC RESEARCH

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AD-278 416 DIV. 25

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AD-278 511 DIV. 25

*SCIENTIFIC RESEARCH
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WORK PROGRAM FOR FISCAL YEAR 1963. RESEARCH AND DEVELOPMENT IN TRAINING METHODS; MOTIVATION; LEADERSHIP; AND MAN-WEAPONS SYSTEM ANALYSIS.
AD-278 600 DIV. 28

*SEMICONDUCTORS

AN INVESTIGATION IS BEING MADE OF RADIATION-INDUCED POLYMERIZATION OF ACETYLENIC DERIVATIVES FOR THE PURPOSE OF PREPARING THERMALLY STABLE, HIGH POLYMER SEMICONDUCTING MATERIALS. EIGHTEEN ACETYLENES WERE RADIOLYZED; G VALUES FOR MONOMER DISAPPEARANCE VARIED FROM 10 TO 200.
AD-278 419 DIV. 20

SILICON, GROWN-JUNCTION, DIFFUSED-BASE TRANSISTORS EXHIBITING AN ABNORMALLY HIGH INPUT IMPEDANCE IN THE COMMON COLLECTOR OR EMITTER-FOLLOWER-AMPLIFIER CIRCUIT. TRANSISTORS DISTINGUISHED BY NOTCHES IN EMITTER, AND COLLECTOR DIODES AND CURRENT GAIN AT VERY LOW FREQUENCIES.
AD-278 637 DIV. 8

MICROWAVE ENERGY CONVERSION TO DIRECT CURRENT BY HIGH-FREQUENCY SEMICONDUCTOR DIODES.
AD-278 703 DIV. 8

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AD-278 729 DIV. 8

*SEMICONDUCTORS
MANUFACTURING METHODS

STUDIES OF THE TRAVELING SOLVENT METHOD OF CRYSTAL GROWTH INCLUDED HALL EFFECT AND RESISTIVITY MEASUREMENTS OF SIC CHIPS; DEPOSITION OF CR FROM CHROMIUM DICUMENE; ELECTRON BEAM AND WETTING STUDIES OF CR ON SIC; ETCHING AND ZONE MOVEMENT AND THE GA-GAAS SYSTEM P-N JUNCTION FORMATION BY SOLVENT DOPING.
AD-278 498 DIV. 25

*SEMICONDUCTORS
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ELECTRICAL AND THERMAL PROPERTIES OF OXIDE SEMICONDUCTOR MATERIALS - TITANIUM OXIDES; THERMOELECTRICITY.
AD-278 671 DIV. 14

*SEQUENTIAL ANALYSIS

A GENERAL DISCUSSION IS GIVEN OF THE TECHNIQUE PROPOSED BY BOX FOR EXPLORING RESPONSE SURFACES.
AD-278 836 DIV. 15

*SERIES

THE DISTRIBUTION OF THE TWO-SAMPLE CRAMER-VON MISES CRITERION FOR SMALL EQUAL SAMPLES IS TREATED.
AD-278 591 DIV. 15

FINITE SEQUENCES OF OBSERVATION; Y1, Y2, ...YT ARE TREATED WHICH ARE REAL-VALUED MEASUREMENTS ON SOME QUANTITY AT T SUCCESSIVE EQUALLY SPACED POINTS IN TIME.
AD-278 648 DIV. 15

AN ANALYSIS IS PRESENTED OF A SINGLE TIME SERIES; I.E. ONE IN WHICH ONE TYPE OF MEASUREMENT IS MADE REPEATEDLY ON THE SAME OBJECT OR INDIVIDUAL.
AD-278 649 DIV. 15

*SERVO MOTORS

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AD-278 706 DIV. 30

*SHEETS

AN ANALYSIS OF THE CRITICAL PROBLEM OF SPHERES AND SLABS AND NEUTRON PRODUCTION IN A HOMOGENEOUS REACTOR IS STUDIED.
AD-278 477 DIV. 20

A STEADY, INCOMPRESSIBLE, ELECTRICALLY CONDUCTING, LAMINAR BOUNDARY LAYER OVER A SEMI-INFINITE FLAT PLATE IS TREATED.
AD-278 694 DIV. 9

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AD-278 737 DIV. 17

*SHEETS
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FAILURE OF THIN METAL PLATES (AL) UNDER HYPERVELOCITY IMPACT; GEOMETRICAL FEATURES OF PERFORATIONS; AND SPATIAL, MASS, AND VELOCITY DISTRIBUTIONS OF EJECTA PRODUCED.
AD-278 641 DIV. 22

*SHIP HULLS

THE EXACT AND LINEARIZED DIPOLE DISTRIBUTIONS GENERATING LENTICULAR CYLINDERS IN AN INFINITE FLUID ARE COMPARED FOR VARIOUS VALUES OF A FULLNESS PARAMETER.
AD-278 726 DIV. 9

*SHOCK WAVES

A SIMILARITY SOLUTION IS OBTAINED FOR THE FLOW BEHIND A VERY STRONG CYLINDRICAL MAGNETOHYDRODYNAMIC SHOCK WAVE PRODUCED BY A SUDDEN RELEASE OF ENERGY ALONG A LINE OF INFINITE EXTENT IN A PLASMA.
AD-278 473 DIV. 25

*SHOCK WAVES
WAVE TRANSMISSION

THE PROPAGATION OF SHOCK AND PRESSURE WAVES IN THE UPPER ATMOSPHERE IS ANALYZED.
AD-278 487 DIV. 9

*SILICIDES

KINETICS OF OXIDATION OF MO AND MO SILICIDES WAS STUDIED BY UTILIZING A THERMAL CONDUCTIVITY BRIDGE AT TEMPERATURES BETWEEN 1000 AND 1725 C.
AD-278 826 DIV. 17

*SILICON COATINGS

EVALUATION TESTS OF 7 OXIDATION PROTECTIVE COATINGS APPLIED TO F8-85 AND D-14 ALLOYS. TEMPERATURE RANGES WERE FROM 1600 TO 2600 F, AND AT 2000 AND 2600 F AFTER ROOM TEMPERATURE PRESTRAIN IN BOTH ELASTIC AND PLASTIC REGIONS.
AD-278 727 DIV. 14

*SILVER COMPOUNDS

DELINEATION OF TRACKS OF HEAVY COSMIC RAYS AND NUCLEAR PROCESSES WITHIN LARGE CRYSTALS OF SILVER CHLORIDE.
AD-278 672 DIV. 20

*SINGLE CRYSTALS

THE CRYSTAL GROWTH OF FLUOALUMINATES WAS INVESTIGATED BY VARIOUS PROCESSING EXPERIMENTS. THESE INCLUDED THE BRIDGMAN, CHALMERS, AND CZOCHRALSKI METHODS, SPRAYING OF MOLTEN KALF4, VAPOR DEPOSITION OF KALF4, AND A HOT WIRE TECHNIQUE. THE CZOCHRALSKI METHOD WAS MOST PROMISING BUT WILL REQUIRE PRECISE PROCESS CONTROL.
AD-278 469 DIV. 25

*SINGLE CRYSTALS
CADMIUM

RESEARCH ON THE BEHAVIOR OF METALLIC CRYSTALS INCLUDED THE FOLLOWING STUDIES; CONTROLLED OXIDATION OF CD SINGLE- AND BI-CRYSTALS, DECORATION OF CD BI-CRYSTALS BY VAPOR DEPOSITION OF CD, DECORATION MECHANISM OF ZN ON CD SINGLE- AND BI-CRYSTALS, CONTROLLED REDUCTION OF HEMATITE CRYSTALS.
AD-278 481 DIV. 4

*SINGLE CRYSTALS
GROWTH

STUDIES OF THE TRAVELING SOLVENT METHOD OF CRYSTAL GROWTH INCLUDED HALL EFFECT AND RESISTIVITY MEASUREMENTS OF SIC CHIPS, DEPOSITION OF CR FROM CHROMIUM DICUMENE; ELECTRON BEAM AND WETTING STUDIES OF CR ON SIC, ETCHING AND ZONE MOVEMENT AND THE GA-GAAS SYSTEM P-N JUNCTION FORMATION BY SOLVENT DOPING.
AD-278 498 DIV. 25

X-RAY DIFFRACTION ANALYSIS, SPECTROGRAPHIC ANALYSIS, AND CHEMICAL ANALYSIS OF ALUMINA WHISKERS GROWN AT 1700 - 1800 C IN ARGON AND HELIUM ATMOSPHERES CONTAINING SMALL AMOUNTS OF HYDROGEN. A SIMPLE TUBE FURNACE APPARATUS FOR WHISKER GROWTH. 59 REFERENCES.
AD-278 806 DIV. 14

*SNOW

THE SETTLEMENTS AND TILTING OF FOOTINGS ON COMPACTED SNOW AND CERTAIN FROZEN GROUNDS ARE TREATED. SUCH FOUNDATIONS SHOW LARGE CREEP DEFORMATIONS WHEN SUBJECTED TO LOADS OF LONG DURATION.
AD-278 533 DIV. 25

BIBLIOGRAPHY ON SNOW, ICE, AND PERMAFROST WITH ABSTRACTS.
AD-278 593 DIV. 2

DENSITY AND PERMEABILITY ANALYSIS OF A GREENLAND SNOW PROFILE.
AD-278 735 DIV. 2

*SOLAR CORONA

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AD-278 456 DIV. 32

*SOLAR FLARES

A STUDY OF SACRAMENTO PEAK FLARES, III SYMPATHETIC FLARES.
AD-278 403 DIV. 2

*SOLID ROCKET PROPELLANTS
DESIGN

A RESEARCH STUDY TO ADVANCE THE STATE-OF-THE-ART OF SOLID PROPELLANT GRAIN DESIGN.
AD-278 732 DIV. 10

*SOLID STATE PHYSICS

QUARTERLY PROGRESS REPORT OF THE SOLID-STATE AND MOLECULAR THEORY GROUP, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS.
AD-278 416 DIV. 25

THE RESEARCH IN NETWORK THEORY AND PRACTICE IS PRESENTED WITH EMPHASIS ON UNCONVENTIONAL TECHNIQUES AND CIRCUIT ELEMENTS CARRIED OUT FOR LUMPED, DISTRIBUTED AND ACTIVE SYSTEMS.
AD-278 463 DIV. 25

*SOLID STATE PHYSICS
OPTICAL MATERIALS

PROBLEMS OF AN OPTICAL RADAR SYSTEM; USEFULNESS OF COMMERCIALLY AVAILABLE LASERS FOR SUCH A SYSTEM; AND SOLID STATE RESEARCH PROVIDING NEW MATERIALS FOR LASER-TYPE DEVICES.
AD-278 640 DIV. 6

*RADIO TRANSMISSION
IONIZATION

AN ANNOTATED BIBLIOGRAPHY OF R-F BLACKOUT PHENOMENA. THEORETICAL AND EXPERIMENTAL STUDIES OF CAUSES AND POSSIBLE SOLUTIONS TO THE PROBLEM. 1959 - FEBRUARY 1962.
AD-278 678 DIV. 8

*RADIO WAVES

THE COMPENSATION THEOREM IS APPLIED TO THE PROBLEM OF THE SKY-WAVE FIELD FROM A VERTICAL ELECTRIC DIPOLE PLACED ON AN INHOMOGENEOUS FLAT EARTH CONSISTING OF TWO MEDIA, ONE PERFECTLY CONDUCTING AND ONE HAVING A FINITE CONDUCTIVITY.
AD-278 500 DIV. 8

*RADIOACTIVE ISOTOPES

ER-172 AND DY-166 WITH HALF-LIVES OF 48.7 PLUS OR MINUS 0.5 HOURS AND 81.3 PLUS OR MINUS 0.2 HOURS WERE PRODUCED BY DOUBLE NEUTRON CAPTURE FORM ER-170 AND DY-164.
AD-278 597 DIV. 20

*RADIOFREQUENCY AMPLIFIERS

TUNNEL EMISSION AMPLIFIER INVESTIGATION. DIODE AND TRIODE STRUCTURES OF VARIOUS MATERIALS WERE PREPARED AND TESTED.
AD-278 655 DIV. 8

*RADIOFREQUENCY FILTERS

GENERATION AND SUPPRESSION OF SPURIOUS OUTPUTS IN KLYSTRON AMPLIFIERS; HARMONIC GENERATION; MUTUAL INTERMODULATION BETWEEN 2 TRANSMITTERS; AND LONG-LINE DISTORTION IN FM TRANSMITTERS.
AD-278 657 DIV. 8

*RADIOFREQUENCY FILTERS
MICROWAVE FREQUENCY

COAXIAL ABSORPTION LEAKY-WAVE FILTER FOR HIGH POWER APPLICATION.
AD-278 716 DIV. 8

*RADIOFREQUENCY FILTERS
NARROWBAND

PERFORMANCE OF 2 HIGH POWER, NARROW-BAND-PASS, TRANSMITTER-OUTPUT FILTERS, ARE CENTERED AT 10 MC AND THE OTHER AT 300 MC; INSERTION LOSS IN THE STOP BANDS.
AD-278 715 DIV. 8

*RADIOFREQUENCY POWER

HIGH POWER CAPABILITIES OF WAVEGUIDE SYSTEMS. VARIOUS EFFECTS IN WAVEGUIDE SYSTEMS WHICH LEAD TO FAILURES AT ULTRA-HIGH POWER LEVELS WHERE HIGH AVERAGE AND HIGH PEAK POWER BECOME LIMITING FACTORS.
AD-278 684 DIV. 8

*RADIOFREQUENCY POWER
INTERFERENCE

HIGH-POWER FILTER TECHNIQUES TO SUPPRESS THE RADIATION OF SPURIOUS FREQUENCIES FROM HIGH-POWER SOURCES.
AD-278 719 DIV. 8

*RADIOFREQUENCY POWER
MEASUREMENT

GENERATION AND SUPPRESSION OF SPURIOUS OUTPUTS IN KLYSTRON AMPLIFIERS; HARMONIC GENERATION; MUTUAL INTERMODULATION BETWEEN 2 TRANSMITTERS; AND LONG-LINE DISTORTION IN FM TRANSMITTERS.
AD-278 657 DIV. 8

*RADIOFREQUENCY SPECTRUM ANALYZERS

GENERATION AND SUPPRESSION OF SPURIOUS OUTPUTS IN KLYSTRON AMPLIFIERS; HARMONIC GENERATION; MUTUAL INTERMODULATION BETWEEN 2 TRANSMITTERS; AND LONG-LINE DISTORTION IN FM TRANSMITTERS.
AD-278 657 DIV. 8

*RAINDROPS

ELECTROSTATIC FORCES BETWEEN RAINDROPS.
AD-278 668 DIV. 2

*RARE EARTH COMPOUNDS

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. DATA ON THE FOLLOWING STANDARD CERAMIC BODIES IS TABULATED COMBINATIONS CONSISTING OF VARIOUS MX ADDITIONS OF Y2O3, LA2O3 OR NB2O5 TO CEO2; VARIOUS MX ADDITIONS OF CDO, BI2O3, SB2O5, MOO3 OR WO3 TO PBNB2O6 OR PB2NB2O7.
AD-278 451 DIV. 25

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. STANDARD CERAMIC BODIES OF SIMPLE AND MULTIPLE OXIDES WERE FORMED. TEMPERATURE, SEEBECK COEFFICIENT, AND RESISTIVITY VALUES ARE TABULATED FOR 47 STANDARD CERAMIC BODY COMPOSITIONS.
AD-278 452 DIV. 25

*RARE EARTHS

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. DATA ON THE FOLLOWING STANDARD CERAMIC BODIES IS TABULATED COMBINATIONS CONSISTING OF VARIOUS MX ADDITIONS OF Y2O3, LA2O3 OR NB2O5 TO CEO2; VARIOUS MX ADDITIONS OF CDO, BI2O3, SB2O5, MOO3 OR WO3 TO PBNB2O6 OR PB2NB2O7.
AD-278 451 DIV. 25

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. STANDARD CERAMIC BODIES OF SIMPLE AND MULTIPLE OXIDES WERE FORMED. TEMPERATURE, SEEBECK COEFFICIENT, AND RESISTIVITY VALUES ARE TABULATED FOR 47 STANDARD CERAMIC BODY COMPOSITIONS.
AD-278 452 DIV. 25

*REACTION KINETICS

KINETICS OF OXIDATION OF MO AND MO SILICIDES WAS STUDIED BY UTILIZING A THERMAL CONDUCTIVITY BRIDGE AT TEMPERATURES BETWEEN 1000 AND 1725 C.
AD-278 826 DIV. 17

*REACTOR KINETICS

THE EFFECT ON HOMOGENEOUS BARE REACTORS OF A MATERIAL HAVING STRONG RESONANCE ABSORPTION BANDS IS DISCUSSED.
AD-278 467 DIV. 20

*REASONING

LINEAL INCLINATION IN ENCODING INFORMATION SYMBOLICALLY ON CATHODE RAY TUBES AND SIMILAR DISPLAYS. AN EQUAL-DISCRIMINABILITY SCALE OF LINEAL INCLINATION WAS CONSTRUCTED AND VALIDATED. EFFECTS OF USING DIFFERENT READOUT SYSTEMS AND EFFECTS OF DISPLAYING THE SYMBOLS IN DIFFERENT VISUAL SURROUNDS.
AD-278 825 DIV. 28

*RECORDING SYSTEMS

A SYSTEM FOR THE AVERAGING AND ANALYSIS OF REPEATED EEG SIGNALS, EMPLOYING A CLOSED-LOOP MAGNETIC TAPE AND PULSE-INTERVAL MODULATION.
AD-278 590 DIV. 8

*RECOVERY

METHOD OF RECOVERING POTABLE WATER FROM URINE BY SOLUTE CONCENTRATION OF A LIQUID-ICE PHASE SYSTEM (REITERATIVE FREEZING) AS A MEANS OF PURIFICATION. EFFECT OF FREEZING UPON THE DISTRIBUTION OF MICRO-ORGANISMS IS DISCUSSED. ENERGY REQUIREMENTS FOR THE RECOVERY PROCESS BY VARIOUS REITERATIVE SCHEMES ARE CALCULATED.
AD-278 833 DIV. 16

*RECTIFIERS

MICROWAVE ENERGY CONVERSION TO DIRECT CURRENT BY HIGH-FREQUENCY SEMICONDUCTOR DIODES.
AD-278 703 DIV. 8

*RE-ENTRY VEHICLES
DETECTION

APPLICATION OF RECOGNITION THEORY TO MISSILE IDENTIFICATION AND DECOY DISCRIMINATION. VOLUME 2. THEORETICAL AND COMPUTATIONAL ASPECTS OF THE MAIN PROBLEM.
AD-278 687 DIV. 12

*REFRACTORY COATINGS

EVALUATION TESTS OF 7 OXIDATION PROTECTIVE COATINGS APPLIED TO FS-85 AND D-14 ALLOYS. TEMPERATURE RANGES WERE FROM 1600 TO 2600 F, AND AT 2000 AND 2600 F AFTER ROOM TEMPERATURE PRESTRAIN IN BOTH ELASTIC AND PLASTIC REGIONS.
AD-278 727 DIV. 14

*REFRACTORY MATERIALS
HIGH TEMPERATURE RESEARCH

THE EFFECT OF MOLTEN ALKALI METALS ON CONTAINMENT METALS AND ALLOYS AT HIGH TEMPERATURES.
AD-278 654 DIV. 17

*REFRACTORY MATERIALS
PHASE TRANSITIONS

THE EFFECTS OF SOLUTES ON THE DUCTILE-TO-BRITTLE TRANSITION IN REFRACTORY METALS.
AD-278 652 DIV. 17

*REFRACTORY MATERIALS
PROCESSING

PROCESSING VARIABLES AND FABRICATION TECHNIQUES TO BE USED IN THE PRODUCTION OF HARDWARE STRUCTURES MADE OF NIOBIUM BERYLLIDES ARE DISCUSSED. INTERMETALLIC COMPOUNDS OF NB8E12, NB2BE17, NB23E19, AND TA2BE17 WERE FABRICATED. SINTERING STUDIES WERE MADE OF NB2BE17.
AD-278 807 DIV. 17

*RELATIVITY THEORY

THE PRECESSION RATE OF THE SPIN AXIS OF A SPHERICAL GYROSCOPE MOVING THROUGH THE EARTH'S GRAVITATIONAL FIELD IS DISCUSSED IN RELATION TO THE THEORY OF RELATIVITY.
AD-278 437 DIV. 25

*RELAXATION TIME

ASYMMETRIC RELAXATION AND COMPLIANCE MATRICES IN LINEAR VISCOELASTICITY.
AD-278 544 DIV. 25

*RESEARCH PROGRAM ADMINISTRATION

WORK PROGRAM FOR FISCAL YEAR 1963. RESEARCH AND DEVELOPMENT IN TRAINING METHODS; MOTIVATION; LEADERSHIP; AND MAN-WEAPONS SYSTEM ANALYSIS.
AD-278 600 DIV. 28

*RESISTORS

VAPOR-DEPOSITED SILICON ELEMENTS AND DIFFUSED SILICON ELEMENTS. IMPROVEMENT OF OHMIC CONTACTS; SHEET RESISTIVITY AND METHODS OF ADJUSTMENT.
AD-278 729 DIV. 8

*RESONANCE ABSORPTION

THE EFFECT ON HOMOGENEOUS BARE REACTORS OF A MATERIAL HAVING STRONG RESONANCE ABSORPTION BANDS IS DISCUSSED.
AD-278 467 DIV. 20

*RING WINGS
SUPERSONICS

THE DESIGN AND TEST AT MACH NUMBER 2.5 OF TWO LOW WAVE DRAG RING-WING CONFIGURATIONS OF ASPECT RATIO 1.3 AND 2.6.
AD-278 486 DIV. 9

*ROCKET CASES
EXPLOSIVE FORMING

TECHNIQUES AND PARAMETERS FOR EXPLOSIVE FORMING OF 120-INCH SOLID ROCKET PROPELLANT CLOSURES. DIE FABRICATION AND SUBSCALE TESTING WITH FREE-FORMING DIE.
AD-278 805 DIV. 27

*ROCKET CASES
MATERIALS

EVALUATION OF 18-7-5 (INCO 250 KSI) AND 18-9-5 (INCO 300 KSI) NICOMO MAR-AGING STEELS LED TO THE SELECTION OF THE LATTER FOR APPLICATION IN PRESSURE VESSELS REQUIRING MATERIAL STRENGTHS IN EXCESS OF 250,000 PSI. BASIC WELDABILITY CHARACTERISTICS WERE EXCELLENT.
AD-278 710 DIV. 17

*ROCKET OXIDIZERS
FIRES

BURNING RATES, EXTINGUISHING AGENTS AND EXTINGUISHMENT MECHANISMS WERE DETERMINED FOR OPEN-PAN FIRES OF N2H4, UDMH, JP-XA. A 50-50 MIXTURE OF N2H4 AND UDMH OXIDIZED BY AIR AND N2O4 WAS STUDIED IN OPEN-PANS AND IN A 1/50 SCALE MODEL OF A TITAN II SILO.
AD-278 802 DIV. 10

*ROCKET OXIDIZERS
MATERIALS

RESEARCH ON FLUORINE CHEMISTRY, INCLUDING ELECTROCHEMISTRY OF HF-N2O4 AND HF-NO SYSTEMS. SYNTHESIS OF NO3F OR OF OF2 IN THE HF-NO SYSTEM DEPENDED ON ELECTRODE PASSIVATION. ELECTROLYSIS OF HF-N2O (NAF) YIELDED NF3.
AD-278 682 DIV. 10

*ROCKET OXIDIZERS
TOXICITY

COMPLETENESS OF REACTION, RADIANT HEAT FLUX, AND TOXIC VAPOR DESTRUCTION TESTS OF TITAN II FUEL TANKAGE SYSTEMS.
AD-278 607 DIV. 10

*RUBIDIUM COMPOUNDS

VAPOR PRESSURES IN THE LIQUID SYSTEM RB2O-B2O3. MEASUREMENT BY TRANSPIRATION METHOD. DERIVED THERMODYNAMIC DATA AND A STRUCTURAL INTERPRETATION.
AD-278 573 DIV. 4

*RUBY

NUCLEAR RESONANCE STUDIES INCLUDED THE NUCLEAR MAGNETIC RESONANCE OF AL IN RUBY AND LICL AND LIF CONTAINING MN ION IMPURITIES. ELECTRON PARAMAGNETIC RESONANCE STUDIES INDICATED THAT THE MN ION EXISTED IN A DILUTE AND CONCENTRATED PHASE IN LICL; IN LIF THIS TENDENCY DID NOT OCCUR UP TO 10 MOLE-% MN ION.
AD-278 429 DIV. 25

*RUPTURE

OXIDE BONDING AND THE CREEP-RUPTURE STRENGTH

***SUNSPOTS**

RELATIONSHIP BETWEEN TECTONIC ACTIVITY AND SOLAR ACTIVITY.
AD-278 629 DIV. 2

***SUPPLIES**
PARACHUTE DESCENTS

AN ANALYSIS IS REPORTED OF THE LOADING CONFIGURATIONS OF THREE SEPARATE LOADS IN THE M-4A HIGH SPEED AERIAL DELIVERY CONTAINER.
AD-278 585 DIV. 29

***SURFACE PROPERTIES**

OBSERVATIONS MADE ON THE FRACTURE SURFACES OF STEELS AND ALUMINUM ALLOYS RESULTING FROM BRITTLE, DUCTILE, FATIGUE, AND INTERGRANULAR FRACTURES.
AD-278 542 DIV. 25

***SURFACES**

OBSERVATIONS MADE ON THE FRACTURE SURFACES OF STEELS AND ALUMINUM ALLOYS RESULTING FROM BRITTLE, DUCTILE, FATIGUE, AND INTERGRANULAR FRACTURES.
AD-278 542 DIV. 25

***SURVIVAL**

AGGLUTININ ANTIBODY LEVEL OF ANIMALS IMMUNIZED IN THE COLD AND AT 2 C WERE INVESTIGATED. ANTIBODY FORMATION WAS NOT INHIBITED BY ANIMALS CHRONICALLY EXPOSED TO LOW AMBIENT TEMPERATURES.
AD-278 531 DIV. 16

***SWEAT COOLING**

ENERGY TRANSFER ON A NON-ABLATING METAL ANODE OF A HIGH-INTENSITY ARGON ARC. ENERGY BALANCE OF A TRANSPIRATION-COOLED POROUS CARBON ANODE OF A HIGH-INTENSITY ARGON ARC.
AD-278 570 DIV. 25

***SYMPOSIA**
TEST FACILITIES

PROCEEDINGS OF THE THIRD ALL-IRIG SYMPOSIUM! RANGE INSTRUMENTATION.
AD-278 438 DIV. 12

***SYNCHROS**

FAILURE OF PRECISION INSTRUMENT COMPONENTS SUCH AS SYNCHROS, RESOLVERS, SERVO MOTORS AND MOTOR-TACHOMETERS.
AD-278 704 DIV. 30

***SYNTHETIC FIBERS**

PROCEDURES AND TECHNIQUES FOR MANUFACTURING LARGE LOW-DENSITY AIRMAT STRUCTURES MADE OF METALLIC CLOTH AND YARNS CAPABLE OF SMALL VOLUME PACKAGING. MACHINE DESIGN AND SPECIFICATIONS.
AD-278 667 DIV. 14

***TACHOMETERS**

FAILURE OF PRECISION INSTRUMENT COMPONENTS SUCH AS SYNCHROS, RESOLVERS, SERVO MOTORS AND MOTOR-TACHOMETERS.
AD-278 704 DIV. 30

***TANTALUM CAPACITORS**

DESIGN AND DEVELOPMENT OF SOLID ELECTROLYTE TANTALUM CAPACITORS, ONE CAPABLE OF OPERATION AT 100 VOLTS AT 85 C, THE OTHER AT 20 VOLTS AT 85 C.
AD-278 820 DIV. 8

***TARGET RECOGNITION**

THE DEVELOPMENT OF A CONDITIONED-REFLEX SYSTEM FOR USE IN AUTOMATIC ECM MODE SELECTION IS DISCUSSED.
AD-278 496 DIV. 30

***TAYLOR'S SERIES**

THE STRESSES INDUCED BY A PERFORATION IN AN OTHERWISE UNIFORMLY STRESSED PLATE OF ARBITRARY FINITE THICKNESS ARE ANALYZED.
AD-278 645 DIV. 25

***TELEMETER SYSTEMS**
MULTIPLEX TRANSMISSION

SAMPLING RATE AND ALIASING IN TIME-DIVISION TELEMETRY.
AD-278 515 DIV. 12

***TELEMETERING TRANSMITTERS**
RADIOFREQUENCY GENERATORS

VOLTAGE-TUNABLE MICROWAVE OSCILLATOR FOR SATELLITE VEHICLE TELEMETRY TRANSMITTERS, 10 WATT RADIATING POWER SOURCE! ELECTROSTATICALLY-FOCUSED TRAVELING-WAVE TUBE AMPLIFIER WHICH FEEDS-BACK POWER TO ITS INPUT THROUGH A MICROWAVE CAVITY.
AD-278 713 DIV. 8

***TENSILE PROPERTIES**

THE LEAST WEIGHT PROPORTIONS OF HEAD CLOSURES (DOMES) FOR LONG CYLINDRICAL PRESSURE VESSELS ARE DERIVED.
AD-278 484 DIV. 9

THE STRESSES INDUCED BY A PERFORATION IN AN OTHERWISE UNIFORMLY STRESSED PLATE OF ARBITRARY FINITE THICKNESS ARE ANALYZED.
AD-278 645 DIV. 25

***TENSOR ANALYSIS**

SUMMARIZES THE MAIN RESULTS IN KINEMATICS OF ORIENTED MEDIA. KINEMATICS OF ORDINARY CONTINUA, MULTIPLE SPACE TENSORS AND TIME RATES OF TENSORS ARE REVIEWED.
AD-278 706 DIV. 15

***TERMINAL BALLISTICS**
FRAGMENTATION AMMUNITION

IMPACT AND PENETRATION OF 0.100-INCH ALUMINUM PLATES BY ALUMINUM PROJECTILES AT 29,000-33,000 FEET PER SECOND USING THE SHAPED CHARGE HYPERVELOCITY PROJECTILE ACCELERATOR. ANALYSIS OF 128 DATA POINTS WITH ANGLES OF OBLIQUITY OF 90, 50, AND 20 DEGREES.
AD-278 537 DIV. 22

***TERRAIN**

THE LOAD FACTOR (G FORCE) EXERTED ON THE PILOT DURING ANY LONGITUDINAL MANEUVER MUST BE RESTRICTED TO THE PHYSIOLOGICAL TOLERANCE OF THE PILOT. RESTRICTIVE TOLERANCES OF BOTH NEGATIVE AND POSITIVE G-FORCES WHICH IMPOSE ON LOW-LEVEL, HIGH-SPEED FLIGHT WERE INVESTIGATED.
AD-278 653 DIV. 16

***TERRESTRIAL MAGNETISM**

A SUMMARY AND DISCUSSION IS PRESENTED OF A FEW SELECTED FEATURES OF THE GEOMAGNETIC FIELD IN SPACE, AND SOME ATTRIBUTES OF THE ENERGETIC AND OTHER CHARGED PARTICLES TRAPPED OR GUIDED BY THIS FIELD. SPECIAL ATTENTION IS GIVEN TO AURORAL PARTICLES.
AD-278 475 DIV. 2

THE INFLUENCE OF THE EARTH'S CORE UPON THE RATE OF THE EARTH'S ROTATION.
AD-278 476 DIV. 2

***TEST FACILITIES**
ELECTRON TUBES

CONSTRUCTION AND INSTALLATION OF A SUPER-POWER KLYSTRON TUBE-TEST FACILITY.
AD-278 586 DIV. 30

***TEST SETS**
PROGRAMMING

INTEGRATED SYSTEM OF MODULAR TEST EQUIPMENT TO PROVIDE A CAPABILITY FOR AUTOMATIC FIELD MAINTENANCE TESTING.
AD-278 638 DIV. 30

***TEXTILES**

PROCEDURES AND TECHNIQUES FOR MANUFACTURING LARGE LOW-DENSITY AIRMAT STRUCTURES MADE OF METALLIC CLOTH AND YARNS CAPABLE OF SMALL VOLUME PACKAGING. MACHINE DESIGN AND SPECIFICATIONS.
AD-278 667 DIV. 14

***THAILAND**
CLIMATIC FACTORS

NOTES ON SOME ENVIRONMENTAL CONDITIONS AFFECTING MILITARY LOGISTICS IN THAILAND.
AD-278 584 DIV. 18

***THERMAL DIFFUSION**

HEAT TRANSFER RATES AND INSULATED WALL TEMPERATURES FOR A TRANSPIRATION COOLED HEMISPHERE.
AD-278 447 DIV. 25

***THERMAL INSULATION**

ALUMINUM PANELS WITH AND WITHOUT A STITCHED LAMINATE INSULATION SYSTEM WERE EVALUATED FOR SONIC FATIGUE. THE INSULATION SYSTEM DID NOT SHORTEN THE SONIC FATIGUE LIFE AND WAS NOT VISIBLY DAMAGED BY SOUND LEVELS TO 170 DB.
AD-278 665 DIV. 1

***THERMAL STRESSES**

A METHOD OF EXPRESSING TWO-DIMENSIONAL THERMAL STRESSES IN A BEAM IN A SERIES INVOLVING THE DERIVATIVES OF THE TEMPERATURE IS DISCUSSED. A SIMPLE ALGEBRAIC METHOD OF OBTAINING THE TERMS IN THE SERIES FOR BOTH LOAD AND TEMPERATURE IS GIVEN.
AD-278 461 DIV. 25

***THERMIONIC EMISSION**

HIGH-TEMPERATURE VAPOR-FILLED THERMIONIC CONVERTER USING A URANIUM-ZIRCONIUM-CARBIDE EMITTER AND A HIGH-TEMPERATURE NICKEL COLLECTOR.
AD-278 816 DIV. 7

THEORETICAL AND EXPERIMENTAL STUDIES TO DETERMINE THE FEASIBILITY OF APPLYING ELECTRON BLACKBODIES TO THERMIONIC ENERGY CONVERSION.
AD-278 824 DIV. 8

***THERMIONIC EMISSION**
ELECTRIC POWER PRODUCTION

LOW TEMPERATURE, PLASMA, VAPOR-FILLED, THERMIONIC CONVERTER WHICH USES A THIRD ELECTRODE TO IONIZE PLASMA AND NEUTRALIZE THE SPACE CHARGE! FOR USE AS A RELIABLE SPACE VEHICLE POWER SUPPLY.
AD-278 810 DIV. 7

***THERMODYNAMICS**

LITERATURE DEALING WITH HIGH-TEMPERATURE THERMODYNAMIC PROPERTIES FOR AIR, N2, O2, A, AND HE (COMPUTED THEORETICALLY FROM STATISTICAL THERMODYNAMICS) IS REVIEWED.
AD-278 589 DIV. 25

***THERMODYNAMICS**
THEORY

THERMODYNAMICS AND TRANSPORT PROCESSES IN MULTICOMPONENT SYSTEMS.
AD-278 571 DIV. 8

***THERMOELECTRICITY**

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. DATA ON THE FOLLOWING STANDARD CERAMIC BODIES IS TABULATED COMBINATIONS CONSISTING OF VARIOUS MX ADDITIONS OF Y203, LA203 OR NB205 TO CE02! VARIOUS MX ADDITIONS OF CDO, BI203, SB205, MOO3 OR WO3 TO PBNB206 OR PB2NB207.
AD-278 451 DIV. 25

RESEARCH ON THE DEVELOPMENT OF THERMOELECTRIC MATERIALS IS DISCUSSED. STANDARD CERAMIC BODIES OF SIMPLE AND MULTIPLE OXIDES WERE FORMED. TEMPERATURE, SEEBECK COEFFICIENT, AND RESISTIVITY VALUES ARE TABULATED FOR 47 STANDARD CERAMIC BODY COMPOSITIONS.
AD-278 452 DIV. 25

EVALUATION OF A MOLYBDENUM EMITTER, LOW VOLTAGE ARC THERMIONIC POWER CONVERTER.
AD-278 817 DIV. 8

***THIN FILMS**
MAGNETIC PROPERTIES

THE TEMPERATURE COEFFICIENT OF RESISTANCE IN ULTRATHIN, EVAPORATED METAL FILMS (INVESTIGATION OF METAL THIN FILM FORMATION AND STRUCTURE).
AD-278 587 DIV. 1

***THRUST METERS**

ANNULAR NOZZLES EJECTORS TO IMPROVE OUT OF GROUND EFFECT PERFORMANCE, GIVES SUPERIOR GROUND EFFECT PERFORMANCE, AND OVERCOME PERFORMANCE LOSS DURING GROUND EFFECT TRANSITION.
AD-278 535 DIV. 27

***THULIUM**

ER-172 AND DY-166 WITH HALF-LIVES OF 48.7 PLUS OR MINUS 0.5 HOURS AND 81.3 PLUS OR MINUS 0.2 HOURS WERE PRODUCED BY DOUBLE NEUTRON CAPTURE FORM ER-170 AND DY-164.
AD-278 597 DIV. 20

***TIME INTERVAL COUNTERS**

DATA RECORDER-REPRODUCER! A TIME INTERVAL MEASURING INSTRUMENT USED IN BALLISTICS FACILITIES OF NAVAL ORDNANCE LAB. CAN MEASURE 999 TIME INTERVALS WITH A PRECISION OF PLUS OR MINUS MICROSECOND FOR A PERIOD OF 0.1 SECOND.
AD-278 455 DIV. 30

***TOPOLOGY**

AN ANALYSIS OF CONVEX CONES INVOLVING INEQUALITIES AND CONE FUNCTIONS.
AD-278 460 DIV. 15

***TRANSFER OF TRAINING**

TRANSFER OF TRAINING WITH SIMULATED AIRCRAFT LONGITUDINAL DYNAMICS IN TERMS OF PERIOD AND DAMPING VALUES OF LONG-PERIOD (PHUGOID) OSCILLATORY TRANSIENTS. LOW AND HIGH CONTROL GAINS ARE CONSIDERED.
AD-278 613 DIV. 28

TRANSFER OF TRAINING WITH SIMULATED AIRCRAFT LONGITUDINAL DYNAMICS. EMPHASIS IS SHIFTED FROM CONTROL TO DISPLAY PARAMETERS. PERFORMANCE IS COMPARED WITH SIMPLE AND COMPLEX COURSE FREQUENCIES OF THE BASIC FORCING FUNCTION.
AD-278 623 DIV. 28

*SOLIDS

THE STRESS AND VELOCITY FIELD OF AN ENERGY SOURCE MOVING IN AN ELASTIC SOLID WITH A FREE SURFACE AT CONSTANT VELOCITY.
AD-278 738 DIV. 25

*SPACE CHARGES

VARIABLE-PITCH HELIX TRAVELING WAVE TUBE. BEATING-WAVE KLYSTRON. X-BAND ELLIPTIC-CAVITY COUPLER. MAGNETRON INJECTION GUN. SPACE-CHARGE WEIGHTING FUNCTIONS FOR A FINITE-DIAMETER ELECTRON BEAM.
AD-278 569 DIV. 8

*SPACE ENVIRONMENTAL CONDITIONS
ELECTROMAGNETIC PROPERTIES

A SUMMARY AND DISCUSSION IS PRESENTED OF A FEW SELECTED FEATURES OF THE GEOMAGNETIC FIELD IN SPACE: AND SOME ATTRIBUTES OF THE ENERGETIC AND OTHER CHARGED PARTICLES TRAPPED OR GUIDED BY THIS FIELD. SPECIAL ATTENTION IS GIVEN TO AURORAL PARTICLES.
AD-278 475 DIV. 2

*SPACE FLIGHT

METHOD OF RECOVERING POTABLE WATER FROM URINE BY SOLUTE CONCENTRATION OF A LIQUID-ICE PHASE SYSTEM (REITERATIVE FREEZING) AS A MEANS OF PURIFICATION. EFFECT OF FREEZING UPON THE DISTRIBUTION OF MICRO-ORGANISMS IS DISCUSSED. ENERGY REQUIREMENTS FOR THE RECOVERY PROCESS BY VARIOUS REITERATIVE SCHEMES ARE CALCULATED.
AD-278 833 DIV. 16

*SPACE MEDICINE

METHOD OF RECOVERING POTABLE WATER FROM URINE BY SOLUTE CONCENTRATION OF A LIQUID-ICE PHASE SYSTEM (REITERATIVE FREEZING) AS A MEANS OF PURIFICATION. EFFECT OF FREEZING UPON THE DISTRIBUTION OF MICRO-ORGANISMS IS DISCUSSED. ENERGY REQUIREMENTS FOR THE RECOVERY PROCESS BY VARIOUS REITERATIVE SCHEMES ARE CALCULATED.
AD-278 833 DIV. 16

*SPECIAL FUNCTIONS

THE WHITTAKER-HILL EQUATION AND THE WAVE EQUATION IN PARABOLOIDAL COORDINATES.
AD-278 740 DIV. 15

*SPECIFICATIONS

PRELIMINARY DESIGN OF THE PROTOTYPE HIGH-ENERGY RATE RUBBER-PAD SHEET METAL-FORMING MACHINE. SPECIFICATIONS; IMPACT RUBBER FORMING; DYNAPAK.
AD-278 666 DIV. 26

*SPECTROGRAPHIC CAMERAS

MEASUREMENT OF SOLAR ULTRAVIOLET SPECTRUM BY MEANS OF ROCKET-CARRIED SPECTROGRAPHS.
AD-278 651 DIV. 25

*SPEECH

SPEECH ANALYSIS TECHNIQUES.
AD-278 479 DIV. 25

THIRTEEN PARAMETERS FOR VOICE RECOGNITION.
AD-278 565 DIV. 25

*SPEECH REPRESENTATION

THIRTEEN PARAMETERS FOR VOICE RECOGNITION.
AD-278 565 DIV. 25

*SPEECH TRANSMISSION

TWO UNRELATED SPEECH COMMUNICATION SYSTEMS ARE DESCRIBED WHICH PROVIDE CERTAIN EFFICIENCIES IN SPEECH CHANNEL USAGE.
AD-278 711 DIV. 5

*SPHERES

AN ANALYSIS OF THE CRITICAL PROBLEM OF SPHERES AND SLABS AND NEUTRON PRODUCTION IN A HOMOGENEOUS REACTOR IS STUDIED.
AD-278 477 DIV. 20

*SPRINGS
EFFECTIVENESS

BIMETALLIC SPRING SYSTEMS OF 40% NI-60% FE ALLOY COMBINED WITH INCONEL X AND TYPE 304 STAINLESS STEEL EXHIBIT CHARACTERISTICS SUITABLE FOR APPLICATIONS FROM -65 F TO 600 F.
AD-278 801 DIV. 19

*STATISTICAL ANALYSIS

LITERATURE DEALING WITH HIGH-TEMPERATURE THERMODYNAMIC PROPERTIES FOR AIR, N2, O2, A, AND HE (COMPUTED THEORETICALLY FROM STATISTICAL THERMODYNAMICS) IS REVIEWED.
AD-278 589 DIV. 25

MATHEMATICAL METHODS OF PATTERN RECOGNITION WHICH MAKE USE OF THE THEORY OF STATISTICAL INFERENCE ARE TREATED.
AD-278 689 DIV. 15

A GENERAL DISCUSSION IS GIVEN OF THE TECHNIQUE PROPOSED BY BOX FOR EXPLORING RESPONSE SURFACES.
AD-278 836 DIV. 15

*STATISTICAL ANALYSIS
CONTROL

A DISCUSSION IS PRESENTED ON HOW STATISTICAL AGGREGATES MAY BE USED BOTH TO IMPROVE INVENTORY MANAGEMENT AND EVALUATE CONTROL SCHEMES BASED ON SUCH USE.
AD-278 471 DIV. 26

*STATISTICAL DISTRIBUTIONS

THE DISTRIBUTION OF THE TWO-SAMPLE CRAMER-VON MISES CRITERION FOR SMALL EQUAL SAMPLES IS TREATED.
AD-278 591 DIV. 15

FINITE SEQUENCES OF OBSERVATION, Y1, Y2, ...YT ARE TREATED WHICH ARE REAL-VALUED MEASUREMENTS ON SOME QUANTITY AT T SUCCESSIVE EQUALLY SPACED POINTS IN TIME.
AD-278 648 DIV. 15

AN ANALYSIS IS PRESENTED OF A SINGLE TIME SERIES, I.E. ONE IN WHICH ONE TYPE OF MEASUREMENT IS MADE REPEATEDLY ON THE SAME OBJECT OR INDIVIDUAL.
AD-278 649 DIV. 15

THE ESTIMATION OF THE DOPPLER SHIFT, FREQUENCY SCALE FACTOR AND AMPLITUDE OF THE SPECTRUM OF A STATIONARY GAUSSIAN RANDOM PROCESS FROM A RECORD OF LIMITED DURATION IS CONSIDERED.
AD-278 686 DIV. 25

*STATISTICAL FUNCTIONS

TABLES TO A PROBABILITY DENSITY FUNCTION THAT IS A REASONABLE APPROXIMATION TO SAMPLING DISTRIBUTIONS FOUND IN SEVERAL MONTE CARLO TRANSPORT CODES.
AD-278 488 DIV. 15

*STATISTICAL PROCESSES

A COMBINATORIAL METHOD FOR PRODUCTS OF TWO MULTIPLE K-STATISTICS.
AD-278 593 DIV. 15

APPLICATION OF STOCHASTIC APPROXIMATION METHODS TO SYSTEM OPTIMIZATION.
AD-278 693 DIV. 26

*STEEL
COATINGS

INVESTIGATION OF ELECTRODEPOSITION METHODS FOR APPLYING THIN TEFLON COATINGS TO STEEL SUBSTRATES. THE FILMS ARE TO SERVE AS DRY LUBRICANTS AND PRESERVATIVE COATINGS.
AD-278 562 DIV. 14

*STEEL
CREEP

CREEP PROPERTIES OF FOUR MARTENSITIC STEELS IN SHEET FORM. TESTS OF HOT WORK TOOL STEELS UNIMACH 2 (THERMOLD J) (600, 800, AND 900 F) AND POTOMAC M (600, 800, AND 1000 F); A MARTENSITIC STAINLESS STEEL USS 12 MOV (800, 900, AND 900 F); A LOW ALLOY MARTENSITIC STEEL 17-22A(S) (800, 1000, AND 1050 F).
AD-278 670 DIV. 17

*STEEL
PRESSURE VESSELS

EVALUATION OF 18-7-5 (INCO 250 KSI) AND 18-9-5 (INCO 300 KSI) NICOMO MAR-AGING STEELS LED TO THE SELECTION OF THE LATTER FOR APPLICATION IN PRESSURE VESSELS REQUIRING MATERIAL STRENGTHS IN EXCESS OF 250,000 PSI. BASIC WELDABILITY CHARACTERISTICS WERE EXCELLENT.
AD-278 710 DIV. 17

*STEEL
PROCESSING

THE ROLE OF STRAIN ON THE MECHANICAL PROPERTIES OF H-11 STEEL. STRAIN EFFECTS ON THE RETAINED AUSTENITE AND STRAIN EFFECTS AND SUBSEQUENT AGING ON THE TEMPERED MARTENSITE. ELECTRON MICROSCOPY FOR SELECTED CONDITIONS OF HEAT TREATMENT.
AD-278 847 DIV. 17

*STEREOSCOPIC MAP PLOTTERS

A JOY-STICK CONTROL SYSTEM FOR MECHANIZING THE TRANSLATIONAL MOTIONS OF A STEREOCOMPARATOR.
AD-278 642 DIV. 2

*STORAGE BATTERIES

CYCLE-LIFE TESTS HAVE BEEN CONDUCTED ON ONE TYPE OF 12 AMPERE-HR, SEALED NI-CD CELLS IN 4 TEMPERATURE ENVIRONMENTS AND IN FOUR DEPTHS OF DISCHARGE. IN GROUPS OF 10 CELLS AND IN BATTERIES OF 20 CELLS. CYCLE LIFE IS REDUCED BY HIGH AND LOW AMBIENT TEMPERATURE.
AD-278 647 DIV. 7

*STRAIN GAGES
MEDICAL EQUIPMENT

RUBBER TUBE AS INSULATION IMPROVED THE TIME COURSE COMPENSATION WITH ABRUPT TEMPERATURE CHANGES WHEN USED IN THE MEASUREMENT OF THE PERIPHERAL BLOOD FLOW IN DIGITAL PLETHYSMOGRAPHY.
AD-278 523 DIV. 16

*STRESS (PHYSIOLOGY)

THE INFLUENCE OF PHYSICAL CHARACTERISTICS, PSYCHOLOGICAL FACTORS, AND DRUGS ON THE CAPACITY OF MAN TO WORK IN THE HEAT.
AD-278 697 DIV. 16

*STRESS (PSYCHOLOGY)

THE INFLUENCE OF PHYSICAL CHARACTERISTICS, PSYCHOLOGICAL FACTORS, AND DRUGS ON THE CAPACITY OF MAN TO WORK IN THE HEAT.
AD-278 697 DIV. 16

*STRESSES

THE LEAST WEIGHT PROPORTIONS OF HEAD CLOSURES (DOMES) FOR LONG CYLINDRICAL PRESSURE VESSELS ARE DERIVED.
AD-278 484 DIV. 9

THE STRESSES INDUCED BY A PERFORATION IN AN OTHERWISE UNIFORMLY STRESSED PLATE OF ARBITRARY FINITE THICKNESS ARE ANALYZED.
AD-278 645 DIV. 25

THE STRESS AND VELOCITY FIELD OF AN ENERGY SOURCE MOVING IN AN ELASTIC SOLID WITH A FREE SURFACE AT CONSTANT VELOCITY.
AD-278 738 DIV. 25

PRACTICAL METHODS OF VISCOELASTIC STRESS ANALYSIS AND MECHANICAL MODEL FITTING ARE SUMMARIZED.
AD-278 809 DIV. 25

*STRESSES
BEAMS

A METHOD OF EXPRESSING TWO-DIMENSIONAL THERMAL STRESSES IN A BEAM IN A SERIES INVOLVING THE DERIVATIVES OF THE TEMPERATURE IS DISCUSSED. A SIMPLE ALGEBRAIC METHOD OF OBTAINING THE TERMS IN THE SERIES FOR BOTH LOAD AND TEMPERATURE IS GIVEN.
AD-278 461 DIV. 25

*SUBMARINE HULLS
NOISE

NOISE RADIATION FROM SUBMARINE HULLS; COMPARISON OF THEORY WITH MODEL TESTS; NATURAL FREQUENCIES IN AIR AND WATER OF RING-STIFFENED CYLINDERS; DRIVING POINT IMPEDANCE PHASE MEASUREMENTS; LONGITUDINAL VIBRATIONS OF SPHEROIDAL SHELL.
AD-278 598 DIV. 25

*SUBMARINE NOISE
ANALYSIS

NOISE RADIATION FROM SUBMARINE HULLS; COMPARISON OF THEORY WITH MODEL TESTS; NATURAL FREQUENCIES IN AIR AND WATER OF RING-STIFFENED CYLINDERS; DRIVING POINT IMPEDANCE PHASE MEASUREMENTS; LONGITUDINAL VIBRATIONS OF SPHEROIDAL SHELL.
AD-278 598 DIV. 25

*SUBMINIATURE ELECTRICAL EQUIPMENT

CERAMIC FORMULATIONS FOR USE IN CAPACITORS, STATUS OF SPRAYING CAPABILITY, AND PRECOATING CERAMIC POWDER.
AD-278 722 DIV. 7

*SUBMINIATURE ELECTRONIC EQUIPMENT

MICROWAVE ENERGY CONVERSION TO DIRECT CURRENT BY HIGH-FREQUENCY SEMICONDUCTOR DIODES.
AD-278 703 DIV. 8

*SULFIDES

THERMODYNAMIC THEORY PERMITS PREDICTION OF THE MODE OF VAPORIZATION OF TRANSITION ELEMENT SULPHIDES. MNS IS THE ONLY CLEAR CASE WHERE A GASEOUS SULPHIDE MOLECULE HAS APPRECIABLE CONCENTRATION IN SATURATED VAPOR. THIS WAS CONFIRMED BY MASS SPECTROSCOPY WHICH GAVE THE DISSOCIATION ENERGY VALUE 65 5 KCAL/MOLE.
AD-278 829 DIV. 25

TO FAILURES AT ULTRA-HIGH POWER LEVELS WHERE HIGH AVERAGE AND HIGH PEAK POWER BECOME LIMITING FACTORS.
AD-278 684 DIV. 8

**WAVEGUIDES
RADIOFREQUENCY FILTERS

L-BAND MODEL OF A HIGH-POWER, WIDE-BAND, LOW-PASS, WAFFLE-IRON, WAVEGUIDE FILTER.
AD-278 718 DIV. 8

**WEAPONS
MAINTENANCE

SOME PROCEDURES IN DESIGN FOR MAINTAINABILITY; SUGGESTED PROCEDURES FOR INCLUDING MAINTENANCE DESIGN CONSIDERATIONS IN ADVANCED SYSTEMS ANALYSIS AND CONCEPTUAL DESIGN; TYPES OF MAINTENANCE DESIGN REQUIREMENTS AND SPECIFICATIONS; PURPOSES THEY SERVE.
AD-278 804 DIV. 12

**WEATHER FORECASTING

EVALUATION OF WEATHER FORECAST CAPABILITY FOR TEST OPERATIONS AT THE AIR PROVING GROUND CENTER, EGLIN AFB, FLORIDA.
AD-278 536 DIV. 2

APPLICATION OF SCREENING MULTIPLE-DISCRIMINANT ANALYSIS TO PREDICTION OF SURFACE WIND SPEEDS AT OCEAN STATION VESSEL DELTA.
AD-278 602 DIV. 2

COMPUTER-PROCESSED WEATHER ANALYSIS AND FORECASTING AIDS.
AD-278 720 DIV. 2

**WEIGHTLESSNESS

A LOGICAL INSTRUMENTATION DESIGN APPROACH TO THE FLYING OF ZERO-GRAVITY PARABOLAS. INSTRUMENTATION DESIGN FOR IMPROVING THE ZERO-GRAVITY MISSION EFFECTIVENESS.
AD-278 680 DIV. 30

**WELDED JOINTS

EVALUATION OF 18-7-5 (INCO 250 KSI) AND 18-9-5 (INCO 300 KSI) NICOMO MAR-AGING STEELS LED TO THE SELECTION OF THE LATTER FOR APPLICATION IN PRESSURE VESSELS REQUIRING MATERIAL STRENGTHS IN EXCESS OF 250,000 PSI. BASIC WELDABILITY CHARACTERISTICS WERE EXCELLENT.
AD-278 710 DIV. 17

**WET CELLS

CYCLE-LIFE TESTS HAVE BEEN CONDUCTED ON ONE TYPE OF 12 AMPERE-HR, SEALED NI-CD CELLS IN 4 TEMPERATURE ENVIRONMENTS AND IN FOUR DEPTHS OF DISCHARGE, IN GROUPS OF 10 CELLS AND IN BATTERIES OF 20 CELLS. CYCLE LIFE IS REDUCED BY HIGH AND LOW AMBIENT TEMPERATURE.
AD-278 647 DIV. 7

**WIND

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*X-RAY SPECTROSCOPY

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*ZINC ALLOYS

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SILICON, GROWN-JUNCTION, DIFFUSED-BASE TRANSISTORS EXHIBITING AN ABNORMALLY HIGH INPUT IMPEDANCE IN THE COMMON COLLECTOR OR EMITTER-FOLLOWER-AMPLIFIER CIRCUIT. TRANSISTORS DISTINGUISHED BY NOTCHES IN EMITTER, AND COLLECTOR DIODES AND CURRENT GAIN AT VERY LOW FREQUENCIES.
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*TRANSISTORS

SILICON, GROWN-JUNCTION, DIFFUSED-BASE TRANSISTORS EXHIBITING AN ABNORMALLY HIGH INPUT IMPEDANCE IN THE COMMON COLLECTOR OR EMITTER-FOLLOWER-AMPLIFIER CIRCUIT. TRANSISTORS DISTINGUISHED BY NOTCHES IN EMITTER, AND COLLECTOR DIODES AND CURRENT GAIN AT VERY LOW FREQUENCIES.
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VARIABLE-PITCH HELIX TRAVELING WAVE TUBE. BEATING-WAVE KLYSTRON. X-BAND ELLIPTIC-CAVITY COUPLER. MAGNETRON INJECTION GUN. SPACE-CHARGE WEIGHTING FUNCTIONS FOR A FINITE-DIAMETER ELECTRON BEAM.
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A SUMMARY AND DISCUSSION IS PRESENTED OF A FEW SELECTED FEATURES OF THE GEOMAGNETIC FIELD IN SPACE, AND SOME ATTRIBUTES OF THE ENERGETIC AND OTHER CHARGED PARTICLES TRAPPED OR GUIDED BY THIS FIELD. SPECIAL ATTENTION IS GIVEN TO AURORAL PARTICLES.
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*VAPORIZATION

THERMODYNAMIC THEORY PERMITS PREDICTION OF THE MODE OF VAPORIZATION OF TRANSITION ELEMENT SULPHIDES. MNS IS THE ONLY CLEAR CASE WHERE A GASEOUS SULPHIDE MOLECULE HAS APPRECIABLE CONCENTRATION IN SATURATED VAPOR. THIS WAS CONFIRMED BY MASS SPECTROSCOPY WHICH GAVE THE DISSOCIATION ENERGY VALUE 65 5 KCAL/MOLE.
AD-278 829 DIV. 25

TWO CORRELATIONS HAVE BEEN PROPOSED. THE FIRST RELATES THE DISSOCIATION ENERGY OF HOMONUCLEAR DIATOMIC MOLECULES TO THE LATTICE ENERGY OF THE CORRESPONDING ELEMENTS. THE SECOND RELATES THE LATTICE ENERGY TO THE PROMOTIONAL ENERGY OF A CONFIGURATION COMPOSED OF LOW-LYING EXCITED LEVELS OF THE ATOM.
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MATHEMATICAL ANALYSIS

NOISE RADIATION FROM SUBMARINE HULLS; COMPARISON OF THEORY WITH MODEL TESTS; NATURAL FREQUENCIES IN AIR AND WATER OF RING-STIFFENED CYLINDERS; DRIVING POINT IMPEDANCE PHASE MEASUREMENTS; LONGITUDINAL VIBRATIONS OF SPHEROIDAL SHELL.
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*WAREHOUSES
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CRITERIA WERE STUDIED FOR DESIGNING OPTIMUM FACILITIES TO WAREHOUSE COMMODITIES STORED AND HANDLED IN UNIT LOADS.
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*WATER

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*WAVE CHARACTERISTICS

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AD-278 676 DIV. 8

*WAVEGUIDE COUPLERS

VARIABLE-PITCH HELIX TRAVELING WAVE TUBE. BEATING-WAVE KLYSTRON. X-BAND ELLIPTIC-CAVITY COUPLER. MAGNETRON INJECTION GUN. SPACE-CHARGE WEIGHTING FUNCTIONS FOR A FINITE-DIAMETER ELECTRON BEAM.
AD-278 569 DIV. 8

*WAVEGUIDE COUPLERS
COAXIAL CABLES

COAXIAL ABSORPTION LEAKY-WAVE FILTER FOR HIGH POWER APPLICATION.
AD-278 716 DIV. 8

*WAVEGUIDE COUPLERS
DESIGN

BRANCH GUIDE DIRECTIONAL COUPLERS FOR LOW AND HIGH POWER APPLICATIONS.
AD-278 717 DIV. 8

*WAVEGUIDE FILTERS

L-BAND MODEL OF A HIGH-POWER, WIDE-BAND, LOW-PASS, WAFFLE-IRON, WAVEGUIDE FILTER.
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HIGH-POWER FILTER TECHNIQUES TO SUPPRESS THE RADIATION OF SPURIOUS FREQUENCIES FROM HIGH-POWER SOURCES.
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*WAVEGUIDE FILTERS
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COAXIAL ABSORPTION LEAKY-WAVE FILTER FOR HIGH POWER APPLICATION.
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COAXIAL ABSORPTION LEAKY-WAVE FILTER FOR HIGH POWER APPLICATION.
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*WAVEGUIDES

TRANSMISSION SYSTEMS FOR USE IN THE SUB-MILLIMETER WAVELENGTH REGION; THEORETICAL ANALYSIS TROUGH WAVEGUIDES; ATTENUATION CHARACTERISTICS OF WAVEGUIDE STRUCTURES.
AD-278 656 DIV. 8

HIGH POWER CAPABILITIES OF WAVEGUIDE SYSTEMS. VARIOUS EFFECTS IN WAVEGUIDE SYSTEMS WHICH LEAD

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-278 665 Div. 1
(TISTA/VGW) OTS price $4.60

General Dynamics/Convair, San Diego, Calif.
SONIC FATIGUE TESTS OF THERMAL INSULATION PROTECTION SYSTEMS FOR MACH 3.0 TO 4.4 FLIGHT VEHICLES.
Final rept.,
by H. G. Ruscigno. 1 Apr 62, 41p. incl. illus. tables, 3 refs. (Rept. no. GDC 62-62)
(Contract NOa(s) 59-6263-c)
Unclassified report

DESCRIPTORS: *Metal plates, *Thermal insulation, Supersonics, Sound, Stresses, Aluminum, Acoustic insulation, Insulating materials, Laminates, Tests, Life expectancy, Effectiveness, Supersonic planes, Supersonic test vehicles, Airframes, Fatigue (Mechanics).

Three panels were evaluated for sonic fatigue. One was a bare aluminum plate, the other two were identical except for the addition of a stitched laminate insulation system. It was shown that the addition of Stitched Laminate to an aluminum structure did not shorten the sonic fatigue life, and the insulation system was not visibly damaged by sound levels to 170 db at the frequency of maximum strain for the panel. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-278 403 Div. 2
(TISTP/FR) OTS price $2.60

Air Force Cambridge Research Labs., Bedford, Mass.
A STUDY OF SACRAMENTO PEAK FLARES, III: SYMPATHETIC FLARES,
by H. J. Smith. Apr 62, 21p. incl. tables, 8 refs. (GRD research notes no. 58; AFCRL 472, vol. 3)
(Proj. 7649) Unclassified report

DESCRIPTORS: *Solar flares, Statistical analysis.

A sympathetic flare is defined as one which starts through some influence of another flare which erupted earlier. At least one example has been observed directly. Pure chance should produce many simultaneous flares. Several authors have tested the statistical reality of sympathetic flares by comparing the observed and expected numbers of simultaneous flares. Results of such studies have been contradictory. One method has been applied to Sacramento Peak flares during the IGY, with definitely negative results. The statistical methods are examined critically, with the conclusion that sympathetic flares must be very rare. (Author)

AD-278 405 Div. 2
(TISTP/FR) OTS price $6.60

Geophysical Inst., U. of Alaska, College.
RADIO PROPERTIES OF THE AURORAL IONOSPHERE - PART 2. HIGH LATITUDE OBSERVATIONS OF RADIO STAR SCINTILLATIONS.
Final rept.,
by C. G. Little and G. H. Reid. Mar 62, 61p. incl. illus. tables, 22 refs.
(Contract AF 30(635)2887, Proj. 5535)
(RADC TR 61-217) Unclassified report

DESCRIPTORS: *Extraterrestrial radio waves, Stars, Oscillation, Ionosphere, Aurorae, Radio interferometers.

Previous measurements of radio star scintillation were extended into the auroral zone itself, and it was shown that all previously known effects are greatly magnified in that region. Whether this is due to an intensification of the mechanism operative at lower latitudes, or whether it represents the addition of some completely different agency is not yet resolved. (Author)

AD-278 428 Div. 2
(TISTP/FR) OTS price $1.00

Brookhaven National Lab., Upton, N. Y.
A STUDY OF THE WIND PROFILE IN THE LOWEST 400 FEET OF THE ATMOSPHERE.
Final rept.,
by Irving A. Singer and Constance M. Nagle.
31 Mar 62, 32p. incl. illus. tables, 14 refs.
(Rept. no. BNL 718(T-254))
(Proj. 3A99-27-005-12)
Unclassified report

DESCRIPTORS: *Wind, Temperature, Gusts, Time, Clouds, Measurement, Statistical analysis.

A detailed study of the predictability of the scalar horizontal wind speed at an upper elevation from wind data obtained at lower reference heights over varying averaging lengths is summarized. To study this predictability, several mathematical models were developed. The first, or 'simple;' model was achieved by multiplying the reference speed by a constant to obtain the corresponding average at the higher elevation. This form was suggested by the power law describing the variation of the mean wind speed with height. The simple model, which employs spectral and cross-spectral computation, was used to evaluate the mean square error over various averaging lengths. The second or 'mean' model has the same general form as the first, but the mean value of the wind speed at all levels is subtracted from the actual wind speed prior to computation of the mean square error. The final model produces the best possible predictor using linear methods. This 'best possible' model, although not applicable under actual conditions, provides a benchmark with which the mean square errors from other linear models can be compared. Such comparison clearly indicates that the mean model is an excellent approximation to the best possible. (Author)

AD-278 593 Div. 2
(TISTB/MS) OTS price $3.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
BIBLIOGRAPHY ON SNOW, ICE AND PERMAFROST WITH ABSTRACTS,
ed. by Patrick Bernard. Jan 62, 245p.
(CREEL rept. no. 12, vol. 16)
Unclassified report

DESCRIPTORS: *Snow, *Permafrost, *Ice, *Bibliography.

AD-278 602 Div. 2
(TISTP/FR) OTS price $8.60

Travelers Research Center, Inc., Hartford, Conn.
PREDICTION OF SURFACE WIND SPEEDS OVER THE OCEAN BY STATISTICAL METHODS.
Final rept., 15 June 61-15 June 62,
by Robert G. Miller and Russell G. Harris.
15 June 62, 93p. incl. illus. tables, 3 refs.
(Rept. no. 7022-27)
(Contract N189(188)53868A)
Unclassified report

DESCRIPTORS: *Wind, *Weather forecasting, Oceans, Statistical analysis, Algebra, Velocity.

The application of screening multiple-discriminant analysis to the prediction of surface wind speeds at Ocean Station Vessel 'Delta' 24 and 48 hours in advance is described. A non-mathematical description of the more important concepts in the technique is included. Independent sample results are presented which indicate the feasibility of predicting wind speeds for the time intervals considered. (Author)

AD-278 628 Div. 2
(TISTP/FR) OTS price $1.60

Aerospace Information Div., Washington, D. C.
SUPPLEMENTARY REPORT ON THE ATMOSPHERES OF VENUS AND MARS AND ON THE LUNAR SURFACE AND ATMOSPHERE.
1962, 17p. incl. table, 11 refs. (AID rept. no. 62-97)
Unclassified report

DESCRIPTORS: *Venus, *Mars, *Moon, Atmosphere, Extraterrestrial radio waves, Electrons, Haze, Surface properties, Colors, Temperature, Geology, Bibliography.

This report includes:
ATMOSPHERE OF VENUS.
5p. (Suppl. to AID rept. no. 61-30, AD-254 403)

ATMOSPHERE OF MARS.
3p. (Suppl. to AID rept. no. 61-138, AD-266 481)

SURFACE AND ATMOSPHERE OF THE MOON.
8p. incl. table. (Suppl. to AID rept. 62-4, AD-275 255)

AD-278 629 Div. 2
(TISTP/FR) OTS price $1.10

Aerospace Information Div., Washington, D. C.
TECTONIC PHENOMENA AND SOLAR ACTIVITY,
by E. Torrey and B. A. Yakovlev. 20 June 62,
6p. incl. illus. table (AID rept. no. 62-83;
Trans. from L'vov'. Gosudarstvennyy universitet im. Ivana Franko. Astronomicheskiy sbornik, no. 3-4, 1960, 152-157)
Unclassified report

DESCRIPTORS: *Sunspots, *Earthquakes, *Volcanoes, Statistical analysis.

AD-278 642 Div. 2
(TISTP/FR) OTS price $2.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A JOY STICK CONTROL SYSTEM FOR MECHANIZING THE TRANSLATIONAL MOTIONS OF A COMPARATOR,
by Donald F. Menne. Apr 62, 34p. incl. illus.
(BRL technical note no. 1461)
(Proj. 503-06-011)
Unclassified report

DESCRIPTORS: *Stereoscopic map plotters, *Control systems, Control sticks.

Identifiers: Joy sticks, Stereocomparators.

A control system was developed to mechanize the translational motions of two orthogonal stages on a screw comparator. This system, whose input is a range of joy stick deflections in any direction, has an output that moves the stages so that the resultant motion is in the desired direction and at a rate proportional to the stick deflection. A general analysis of the problem is presented and a specific system developed for the Wild STK-1 Stereocomparator is described. The system was installed on the comparator and tests were made to show the deviation between the resultant heading and the input heading. (Author)

AD-278 650 Div. 2
(TISTP/FR) OTS price $5.60

Cornell U., Ithaca, N. Y.
MAGNETIC EFFECTS OF GEOMAGNETICALLY TRAPPED PARTICLES,
by Martin Lester Dwarkin. May 62, 41p. incl. illus. tables, 22 refs. (Rept. no. CRSR 117)
(Contract AF 49(638)915)
(AFOSR-3003) Unclassified report

DESCRIPTORS: *Van Allen radiation belt, Particles, Terrestrial magnetism, Magnetic effects.

Analysis and calculations of the fields at the surface of the earth due to narrow belts of trapped particles provide a basis for discussing some magnetic effects of geomagnetically trapped particles. The assumption that the particles are trapped in a centered dipole field guarantees the symmetry of magnetic sources about the geomagnetic equatorial plane as well as about the geomagnetic axis, and therefore the same symmetries obtain for the magnetic field at the surface of the earth due to the motion of the particles. Hence, only the field along an arbitrary meridian in one hemisphere is considered. The symmetries of the magnetic source are exactly those of sets of coaxial Helmholtz coils. (Author)

AD-278 668 Div. 2
(TISTP/FR) OTS price $3.60

Illinois State Water Survey, Urbana.
INVESTIGATION OF THE QUANTITATIVE DETERMINATION OF POINT AND AREAL PRECIPITATION BY RADAR ECHO MEASUREMENTS.
Quarterly technical rept. no. 2, 1 Jan-31 Mar 62,
by E. A. Mueller and G. E. Stout. 31 Mar 62,
33p. incl. illus. table, 3 refs.
(Contract DA 36-039-sc-87280)
Unclassified report

DESCRIPTORS: *Raindrops, Photographic analysis, Electrostatic fields, Radar echo areas, Collecting methods.

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-278 457 Div. 2
(TISTP/FR) OTS price $1.60

Naval Civil Engineering Lab., Port Hueneme, Calif.
PRELIMINARY STUDIES CONCERNING STRUCTURES IN THE DEEP OCEAN,
by P. J. Rush. 27 June 62, 14p. incl. illus. 29 refs. (Technical note no. N-447)
Unclassified report

DESCRIPTORS: *Oceans.

The bottom areas of deep oceans offer an entirely new environment for the use of structural materials. Except for signal cables, no man-made structures have been subject to long-term exposure to these conditions. Information about reactions of various materials under combinations of high pressure, constant cold temperature, and immersion in salt water is scant. Available literature on corrosion in ocean waters has mostly to do with shallow depths where the problems of pressure, temperature, oxygen concentration and chemical elements are different from those to be expected in the very deep waters. (Author)

AD-278 475 Div. 2, 1
(TISTA/VGW) OTS price $3.60

RAND Corp., Santa Monica, Calif.
SPACE GEOMAGNETISM, RADIATION BELTS, AND AURORAL ZONES,
by E. H. Vestine. July 62, 33p. incl. illus. table, 39 refs. (Memo. no. RM-3144-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Space environmental conditions, *Terrestrial magnetism, *Aurorae, *Van Allen radiation belt, Radiation effects, Radiation hazards, Ionospheric disturbances, Theory, Electromagnetic properties.

The nature of the geomagnetic field and a few variations from ground level out to about 10 earth radii is discussed. Regions of trapped radiation are noted. The unshielded dosages during a great solar event on a few days per decade exceed limits of human safety. Modest shielding of somewhat less than 1 gm/sq cm will not remove the hazards. The chance is probably only one in several thousand that this will not suffice to preserve life on any given day. Transient accelerations of trapped particles result in atmospheric effects such as the aurora, and the polar electrojets, but the cause of these accelerative actions is quite obscure. (Author)

AD-278 476 Div. 2
(TISTP/FR) OTS price $3.60

RAND Corp., Santa Monica, Calif.
INFLUENCE OF THE EARTH'S CORE UPON THE RATE OF THE EARTH'S ROTATION,
by E. H. Vestine. July 62, 24p. incl. illus. table, 15 refs. (Memo. no. RM-3219-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Earth, *Terrestrial magnetism, Rotation, Fluids.

The effect of the changing fluid motions within the earth's central core upon the rate of the earth's rotation, and therefore upon the length of the astronomical second is reviewed. Estimates of outer core rotation previously made for the period 1830-1945 are extended to 1955. These estimates are inferred from year-to-year changes in the westward drift of the geomagnetic field, probably originating within the earth's central core. Thus the likely major cause of the fluctuations in the rate of the earth's rotation is the magnetic coupling of changing fluid motions within the core to the base of the mantle, a suggestion made independently by Munk and Revelle, and the writer, in 1952. (Author)

AD-278 532 Div. 2
(TISTP/FR) OTS price $4.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
ICE TUNNEL CLOSURE PHENOMENA,
by John F. Abel, Jr. Jan 61, 37p. incl. illus. tables, refs. (Technical rept. no. 74)
(Proj. 8-66-02-400)
Unclassified report

DESCRIPTORS: *Ice, Glaciers, Plasticity, Underground structures.

The mechanics of closure, exhibited by ice tunnels, can be understood by considering the ice as a viscous solid. The viscous solid will flow, when subjected to a force, at a rate dependent on the magnitude of the force, the area of relief open for flow, and the apparent viscosity of the viscous solid. In the case of the ice tunnels, the force inducing the flow is the weight of the overburden; the area of relief open for flow is the tunnel opening; and apparent viscosity is the resistance to flow exhibited by the ice. The closure of a rectangular opening made in ice was measured. Maximum closure occurs at the center of unsupported roof, wall, or floor spans. The vertical closure rate decreases negligibly approximately 2% from the center of a room to approximately 6 ft from the wall. From the point about 6 ft from the wall to the wall, the closure rate decreases about 30%. Approximately 30% of vertical closure at the center of the span is due to flexure of the floor and roof. The remaining 70% is due to shortening of the wall height; the major portion of this wall closure occurs at the bottom of the wall. Over 80% of closure due to flexure of the floor and roof results from flexure of the floor. (Author)

AD-278 536 Div. 2
(TISTP/FR) OTS price $2.60

Air Proving Ground Center, Eglin Air Force Base, Fla.
EVALUATION OF WEATHER FORECAST CAPABILITY FOR TEST OPERATIONS,
by Richard E. Cale. July 62, 24p. incl. illus. tables, 5 refs. (Rept. no. APGC TDR 62-25)
Unclassified report

DESCRIPTORS: *Weather forecasting, Test facilities, Guided missiles, Air force research, Statistical analysis.

Operational planning weather forecasts for the APGC complex were evaluated for the period November 1961 through January 1962 for the purpose of determining forecast capability with respect to type, space, and time. Forecast capability for specific values was comparable to persistence but showed rapid decay with time. The capability to predict trends was statistically significant with no significant decrease of capability with time. Results show how planning forecasts may be utilized to improve operational effectiveness. (Author)

pack, or aid in understanding the dynamic processes which are in action. The new graphical methods described distinguish the separate effects of densification and thermal metamorphism on permeability, permitting future advances in the analysis. Profile data obtained in 1954 and 1960 are reanalyzed using the new techniques. For a natural polar pack under conditions when no melting occurs and the accumulation is assumed continuous, the following conclusions may be made: permeability for a given density of snow increases with depth and time except possibly near the surface or at depths below 30 m; the rate of permeability change with depth for given densities decreases in a calculable way relative to the density; and, mean permeability changes with depth in a complex manner. (Author)

AD-278 812 Div. 2, 25
(TISTP/JW) OTS price $1.60

Florence U. (Italy).
ANGULAR DENSITY AND RANGE DISTRIBUTION OF RADAR ECHOES FROM METEOR TRAILS, IN THE CASE OF UNIFORM DISTRIBUTION OF GEOCENTRIC RADIANTS,
by Nello Carrara, Pier Francesco Checcacci and Laura Ronchi. Nov 61, 15p. incl. illus. 9 refs.
(Technical note no. 4)
(Contract AF 61(052)477)
(AFCRL 62-127) Unclassified report

DESCRIPTORS: *Meteorological radar, *Radar echo areas, Echo ranging, Meteors, Radio ranges, Density, Distribution.

AD-278 813 Div. 2
(TISTP/JW) OTS price $1.60

Florence U. (Italy).
STUDIES ON THE DISTRIBUTION OF RADIO ECHOES FROM METEOR TRAILS.
Final rept.,
by Nello Carrara, Pier Francesco Checcacci and Laura Ronchi. Nov 61, 17p. 20 refs.
(Contract AF 61(052)477)
(AFCRL 62-128) Unclassified report

DESCRIPTORS: *Meteorological radio, *Echo ranging, Radio waves, Meteors.

AD-278 814 Div. 2, 25
(TISTP/JW) OTS price $2.60

Florence U. (Italy).
THE VOLUME DENSITY OF RADAR ECHOES FROM METEOR TRAILS IN TWO PARTICULAR CASES OF HELIOCENTRIC RADIANT DISTRIBUTION,
by Nello Carrara, Pier Francesco Checcacci and Laura Ronchi. Sep 61, 23p. incl. illus. 7 refs.
(Technical note no. 3)
(Contract AF 61(052)477)
(AFCRL 62-126) Unclassified report

DESCRIPTORS: *Meteorological radar, *Radar echo areas, Density, Meteors, Echo ranging, Radio ranges, Volume, Velocity.

Two particular types of distribution of heliocentric meteor radiants are considered. The corresponding expressions of the volume density of radar echoes are determined by introducing for the heliocentric velocity distribution the parabolic-step approximation, described. This kind of approximation allows one to obtain for the volume density of echoes an expression which can easily be evaluated numerically by means of an electronic computer. In sec. 6, a program of numerical calculations is described which will allow one to derive some interesting information about the actual distribution of heliocentric radiants and velocities of meteors. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-278 555 Div. 3
(TISTB/MS) OTS price $3.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
PERSONNEL TARGET ACQUISITION UNDER FLARE ILLUMINATION,
by Paul S. Strauss and Gino R. DeTogni.
July 62, 33p. incl. illus. tables, 2 refs.
(Technical rept. no. 3012)
Unclassified report

DESCRIPTORS: *Flares, *Military personnel, *Human engineering, Target recognition, Illumination, Tests, Design, Detection.

As part of the development of a small, low cost, ground flare, producing 30,000 to 65,000 candlepower for about 45 to 75 seconds, a human factors study of the usefulness of the flare to sentries was conducted. A typical field problem was simulated by placing stationary human targets in varying attitudes (standing, kneeling, and prone) at different radial distances from a burning flare. Ten subjects, in the role of sentries, attempted to detect and identify the targets from a distance of 900 feet. Data analysis for 18 trials indicates that 67.8% of the targets were detected and 58.6% were identified. Positions directly behind and in front of the flare were very difficult to acquire because of glare effects; only 12% in front and 7% behind were identified. Differences between trials were significant but were not related to either candlepower or burning time. Evidence is presented to ascribe these differences to subject awareness and target location. The identification task proved to be an easy one, though no improvement in acquisition was found as a result of practice in target search. Recommendations for flare design and use are made. (Author)

4. CHEMISTRY

AD-278 419 Div. 4, 25
(TISTM/EJH) OTS price $2.60

Monsanto Research Corp., Dayton, Ohio.
RADIATION POLYMERIZATION OF ACETYLENE DERIVATIVES.
Quarterly technical rept. no. 1, 10 Aug-10 Nov 61,
by W. H. Yanko and M. E. Gutzke. 10 Nov 61, 21p. incl. illus. tables, 4 refs.
(Contract NObs-86072)
Unclassified report

DESCRIPTORS: *Acetylenes, *Polymerization, *Polymers, *Semiconductors, Radiation effects, Radiochemistry, Gamma rays, Sensitivity, Ultraviolet spectroscopy, Optical materials, Infrared optical materials, Radiation instruments, Carboxylic acids, Laboratory equipment.

Study of the radiation-induced polymerization of acetylene derivatives was initiated. Eighteen acetylene derivatives were radiolyzed; all proved sensitive to gamma-radiation. G values for monomer disappearance varied from 10 to 200, indicating a chain process. Of the products, only the polymers from neopentylene dipropiolate and acetylenedicarboxylic acid appear to be high molecular weight. UV spectra on the latter showed absorption characteristic of polyenes. (Author)

The data collection period at Coweeta Hydrologic Laboratory, Franklin, North Carolina, terminated on March 31, 1962, at which time 105 rolls of raindrop data were obtained. A resume is given of the computer program to determine the collision efficiency between two water droplets under the influence of electrical forces due to charged drops. This research was initiated because the drop size data indicated coalescence-type distributions. It was felt that the importance of these distributions in the rain mechanisms warranted further study of the manner in which they were generated. Progress reports of the raindrop data collection programs and the data analysis aspects are presented. (Author)

AD-278 685 Div. 2
(TISTP/FR) OTS price $9.60

Johannes Gutenberg-Universitaet (Germany).
RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANSMISSION.
Final technical rept.,
by K. Bullrich, E. de Bary and others. Feb 62, 57p. illus.
(Contract AF 61(052)325)
(AFCRL 62-622) Unclassified report

DESCRIPTORS: *Light transmission, *Scattering, *Polarization, Light, Atmosphere, Haze, Fog, Sun, Aerosols.

AD-278 714 Div. 2
(TISTP/FR) OTS price $6.60

Stanford Research Inst., Menlo Park, Calif.
DIMENSIONS AND DISTRIBUTIONS OF CUMULUS CLOUDS AS SHOWN BY U-2 PHOTOGRAPHS,
by R. H. Blackmer and S. M. Serebreny. July 62, 57p. incl. illus. tables, 15 refs. (Scientific rept. no. 4)
(Contract AF 19(604)7312)
(AFCRL 62-609) Unclassified report

DESCRIPTORS: *Cumulus clouds, Thickness, Distribution, Aerial photographs, Statistical analysis.

The results of analyses of cumulus cloud dimensions and distributions derived from high-altitude photographs of cloud cover taken by U-2 aircraft on flights from Cape Canaveral, Florida, to Edwards Air Force Base, California, on 28 July 1960 and 5 August 1960 are given. Photogrammetric analyses of these films provided measurements of the thickness, length, width, and spacing of the clouds. Distributions of these parameters for all the cumulus clouds are described. Analyses of the relationships between length and width and between horizontal and vertical extent of the clouds are presented. These analyses showed that only about one-third of the clouds were circular and some clouds had lengths more than three times as great as the widths. The comparison of horizontal and vertical extent showed that increases in thickness and length were nearly identical. (Author)

AD-278 720 Div. 2
(TISTP/FR) OTS price $4.60

Stanford Research Inst., Menlo Park, Calif.
COMPUTER-PROCESSED WEATHER ANALYSIS AND FORECASTING AIDS.
Final rept.,
by R. M. Endlich and J. R. Clark. May 62, 41p. incl. illus. 16 refs.
(Contract N189(188)53756A)
Unclassified report

DESCRIPTORS: *Weather forecasting, Meteorological data, Radiosondes, Mathematical analysis, Digital computers, Naval operations.

Research to formulate objective weather analysis and forecasting aids, and to investigate the utility of the objective quantities in naval task force operations is described. The objective aids are calculated by use of an electronic computer. Methods based upon single-station techniques for analysis of rawinsoundings are presented for computing wind shear, lapse rate, thermal advection, the direction towards the most unstable air, and a parcel stability index. These quantities are useful in identifying phenomena such as fronts, troughs, the tropopause, and the level of maximum wind. Average values of height, temperature, humidity, and wind components are computed in six arbitrarily defined layers for purposes of representing the gross atmospheric structure. A simple computer technique for calculating kinematical values of horizontal divergence, vorticity, deformation, vertical motion, and geostrophic departures from layer-averaged wind and height data at three stations is developed and demonstrated for an area comprised of the midwestern United States. (Author)

AD-278 730 Div. 2, 13
(TISTE/CDM) OTS price $10.10

Structural Mechanics Research Lab., U. of Texas, Austin.
ANALYSIS OF STRUCTURAL DAMAGE FROM THE 1960 TSUNAMI AT HILO, HAWAII,
by Hudson Matlock, Lymon C. Reese, and Robert B. Matlock. Mar 62, 95p. illus. table, 15 refs.
(Contract DA 49-146-XZ-028)
(DASA 1268) Unclassified report

DESCRIPTORS: *Ocean waves, *Buildings, *Water waves, *Disasters, Structures, Mathematical analysis, Urban areas, Hawaii, Vulnerability, Floods.

A study was made of Hilo on the Island of Hawaii after the tsunami of 1960 to survey the damage. The principal items studied were the general wave characteristics and the structural damage caused by the waves. The portion of the survey which pertained to onshore effects is reported. Included are studies of height of wave, structural damage caused by the wave, and the pressures on structures from the force of the wave. The velocity of the wave was estimated by three different methods. Reasonable agreement was noted among the three methods. The damage caused by the tsunami is discussed in some detail together with the various conditions which affected the degree of damage. Analyses of several structural elements are presented and conclusions and recommendations are formulated. (Author)

AD-278 735 Div. 2
(TISTP/FR) OTS price $2.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
ANALYSIS OF DATA FROM A SNOW PROFILE,
by R. W. Waterhouse. Feb 62, 14p. illus. tables, 7 refs. (Research rept. no. 90)
Unclassified report

DESCRIPTORS: *Snow, Density, Penetration, Diffusion, Statistical analysis.

A new method is presented for extracting more meaningful information from snow profile data which will simplify the study of the permeability of snow. Earlier analyses normally employed statistical methods to determine property variations with depth, with the line of mean values established by the method of least squares. The mean curves derived in this manner may not represent properly the true nature of the snow

other sources indicate that the vapor molecule should be RbBO2. The activity of the RbBO2 in the melts showed a pronounced discontinuity at about 15 mole percent Rb2O. The activity and other thermodynamic data were compatible with a liquid structure based on Biscoe and Warren's theory, which describes the structures of alkali borate glasses. The activity of the RbBO2 in the melts and the vapor pressure of the RbBO2 above the melts could be decreased by the addition to the melt of oxygen-complexing cations. (Author)

AD-278 690 Div. 4
(TISTM/MS) OTS price $4.60

Milan U. (Italy).
OXYGEN AND HYDROGEN PEROXIDE ELECTROCHEMICAL BEHAVIOUR ON CHROMIUM, NICKEL, COBALT AND STAINLESS STEEL ELECTRODES,
by G. Bianchi, F. Mazza, and T. Mussini. Feb 62, 12p. illus. 14 refs. (Technical note no. 8)
(Contract AF 61(052)260)
(AFOSR-2052) Unclassified report

DESCRIPTORS: *Electrochemistry, *Electrodes, Chromium, Cobalt, Nickel, Nickel electrodes, Stainless steel, Oxygen, Peroxides.

As far as a Ni electrode is concerned, in neutral solution the O2 cathodic reduction is an indirect reduction through the redox couple Ni3O4/NiO, due to the fact that NiO can adsorb large quantities of O2 with formation of Ni3O4. Again in the case of H2O2 solutions the cathodic process is ascribed to an indirect H2O2 reduction: H2O2 forms Ni3O4 on Ni surface and thus H2O2 reduction occurs through the redox couple Ni3O4/NiO. During the H2O2 anodic oxidation Ni electrode is deemed to be coated with a Ni3O4 layer acting as electrode on which H2O2 oxidates at about +500 mv as it was previously observed for magnetite and other metals. The situation is analogous for alkaline solutions. Similar considerations are valid for a Co electrode. In the case of Cr it has been confirmed that no condition allows H2O2 formation by O2 cathodic reduction (this result is verified again in the case of Ni and Co electrodes). It is very particular that O2 and H2O2 cathodic reductions occur for Cr at a potential of about -200 mv independent of the fact that alkaline, neutral or acid solutions are concerned. As far as a stainless steel electrode is concerned, the conclusion can be drawn that stainless steel in neutral media behaves like Fe, from the point of view of O2 and H2O2 reduction; like Cr in alkaline media. (Author)

AD-278 701 Div. 4
(TISTM/TCG) OTS price $1.60

Olin Mathieson Chemical Corp., New Haven, Conn.
CHEMISTRY OF DECABORANE-PHOSPHORUS COMPOUNDS. III. DECABORANE-PHOSPHINE POLYMERS,
by Hansjuergen Schroeder, Joseph R. Reiner and Thomas A. Knowles. 26 July 62, 10p. incl. illus. table, refs. (Technical rept. no. 10)
(Contract Nonr-339500, Proj. NR 356-431)
Unclassified report

DESCRIPTORS: *Decaboranes, *Phosphorus compounds, *Phosphines, *Polymers, Phenyl radicals, Chlorides, Azides, Chemical reactions, Pyrolysis, Decomposition, Solubility, Organic solvents, Temperature, Stability, Spectrographic analysis, Molecular weight, Synthesis.

Under basic conditions B10H12(Ph2P.Cl)2 and B10H12(Ph2P.OH)2 were found to enter into a condensation polymerization with elimination of HCl to form a P-O-P linked polymer, (-OPPh2B10H12PPh2-)x. A study of the pyrolysis of this polymer and monomeric compounds of the type B10H12(Ph2P.R)2 was conducted. B10H12(Ph2P.N3)2 and diphosphines reacted in refluxing benzene with evolution of N to give P=N-P linked polymers of high thermal stability, e.g. (=PPh2-C6H4-PPh2=N-PPh2B10H12 PPh2N=)x, decomposes at greater than 340 degrees. (Author)

AD-278 702 Div. 4
(TISTM/TCG) OTS price $1.60

Olin Mathieson Chemical Corp., New Haven, Conn.
CHEMISTRY OF DECABORANE PHOSPHORUS COMPOUNDS. II. SYNTHESIS AND REACTIONS OF DIPHENYLPHOSPHINODECABORANE,
by Hansjuergen Schroeder. 26 July 62, 14p. incl. illus. refs. (Technical rept. no. 9)
(Contract Nonr-339500, Proj. NR 356-431)
Unclassified report

DESCRIPTORS: *Decaboranes, *Phosphines, *Phosphorus compounds, *Phenyl radicals, Synthesis, Sodium compounds, Substitution reactions, Chemical reactions, Acids, Amines, Decomposition, Alcohols, Salts, Complex ions, Nuclear magnetic resonance, Spectrographic analysis.

Decaboranyl sodium and diphenylchlorophosphine reacted in ether solution to form diphenylphosphinodecaborane (Ph2P-B10H13), the first phosphine substituted decaborane with trivalent phosphorus. B-11 NMR spectral investigation proved the substituent to be at the 6-position. Unlike monomeric phosphinoboranes (R2P-BR2), it is unreactive toward Lewis acids, oxidation and quaternization, but undergoes partial degradation with alcohols to form B9H13-(Ph2PH). Its reactions with amines and phosphines resulting in salts containing the Ph2PB10H12 anion are described. (Author)

5. COMMUNICATIONS

AD-278 512 Div. 5
(TISTE/CDM) OTS price $2.60

Westrex Corp., New York.
DEVELOPMENT OF LIGHT-WEIGHT PORTABLE FACSIMILE SYSTEM.
Final rept., 13 June 57-1 Apr 62,
by H. Weisbecker and K. R. McConnell. 1 Apr 62, 1v. incl. illus.
(Contract DA 36-039-sc-74836)
Unclassified report

DESCRIPTORS: *Facsimile communication systems, *Facsimile equipment, Facsimile recording systems, Facsimile transmission, Telephone lines, Radio transmission, Transistors, Miniature electronic equipment, Military equipment, Mobile.

A facsimile system was developed which comprises a light-weight transmitter and receiver, capable of reproducing copy fed into it at a remote point by sending facsimile signals either over a telephone-line connection or by radio. For the latter mode of operation, a transmitting converter and a receiving converter are provided, as are power supplies for operation from 60 or 400 cycles, when direct operation from 22-30 volts dc is not possible. Operation is also possible in conjunction with auxiliary encoding-decoding equipment. The system transmits in under six minutes an 8-1/2 by 11 in. sheet of copy. Detail is 0.01 inch. 180 lines per minute

Division 4 - CHEMISTRY

AD-278 450 Div. 4, 10
(TISTM/EJH) OTS price $1.60

National Engineering Science Co., Pasadena, Calif.
RESEARCH AND DEVELOPMENT TO SYNTHESIZE AND ISOLATE LESSER OR UNKNOWN BORANES.
Quarterly rept. for July 62,
by J. F. Ditter. 10 July 62, 10p. incl. illus. table (Rept. no. SN/141
(Contract AF 04(611)5156)
Unclassified report

DESCRIPTORS: *Boron compounds, *Diboranes, *Pentaboranes, *Decaboranes, *Hydrides, Synthesis, Chemical reactions, Decomposition, Mass spectroscopy, High pressure research, Low pressure research.

The high pressure reaction of diborane with pentaborane-11 at 30 C was investigated by mass spectrometric methods. The immediate product of this reaction is nonaborane-15, which appears to exist by virtue of some sort of equilibrium condition. Nonaborane-15 at very low pressures (less than 100 microns) was observed to decompose to octaborane and ultimately to hexaborane-10. Decaborane-14 is also formed, but at a slow enough rate to suggest a side reaction. (Author)

AD-278 462 Div. 4
(TISTM/EJH) OTS price $1.60

Pennsalt Chemicals Corp., Philadelphia, Pa.
INORGANIC COORDINATION POLYMERS. III. SUBSTITUTION-ADDITION LEADING TO DIMER FORMATION,
by B. P. Block, E. S. Roth and others. July 62, 10p. illus. refs. (Technical rept. no. 32)
(Contract Nonr-268700)
Unclassified report

DESCRIPTORS: *Polymers, *Complex compounds, *Metalorganic compounds, *Beryllium compounds, *Chromium compounds, Phosphorus compounds, Acetyl radicals, Acetones, Ethers, Phenyl radicals, Decomposition, High temperature research, Gravimetric analysis, Substitution reactions, Chemical reactions, Heterocyclic compounds, Synthesis.

The substitution-addition reactions of excess beryllium(II) and chromium(III) acetylacetonates with diphenylphosphinic acid carried out in melts yield the dimers (Be(C5H702)(OP(C6H5)20))2 and (Cr(C5H702)2(OP(C6H5)20))2 in which the diphenylphosphinate anion acts as a catenating group, rather than a chelating ligand, forming double bridges between the central metallic atoms. Cyclic oligomers are formed in preference to linear polymers under these conditions. The thermal decomposition of these dimers proceeds via initial disproportionation to the respective acetylacetonates and Be(OP(C6H5)20)2 or Cr(C5H702)(OP(C6H5)20)2. (Author)

AD-278 481 Div. 4, 25
(TISTM/EJH) OTS price $3.60

Rome U. (Italy).
RESEARCH ON CHEMICAL BEHAVIOUR OF METALLIC SINGLE-CRYSTALS.
Final technical rept., 1 Apr-30 June 62,
by Felice de Carli. 30 June 62, 23p. illus. 12 refs.
(Contract DA 91-591-EUC-1775)
Unclassified report

DESCRIPTORS: *Single crystals, *Metallic crystals, *Cadmium, *Oxidation, Crystals, Surfaces, Surface properties, Films, Oxides, Vapor deposition, Nucleation, Iron compounds, Reduction, Controlled atmospheres, Decomposition, Chemical reactions.

Cd single- and bi-crystals were subjected to controlled oxidation. The best experimental conditions consisted of a temperature range of 180 to 220 C, a wet oxygen environment, and a test duration of 48 hrs. Both x-rays and ozone were very effective in increasing the surface oxidation of Cd bi-crystals. Preferential oxidation patterns relating to the reciprocal positions of the boundary and the slip directions appeared after previous plastic deformation. In the field of decoration of Cd bi-crystals by means of Cd vapor deposition, a characteristic difference in shape and size of the deposition nuclei was observed on previously oxidized and the unoxidized surfaces. Decoration mechanisms of Zn on Cd single- and bi-crystals are discussed. Results of a controlled reduction process carried out on oxide crystals, in particular, hematite, are discussed. New devices for the electrochemical cutting of metallic crystals are described.

AD-278 499 Div. 4, 10
(TISTM/EJH) OTS price $1.60

6593d Test Group (Dev) Air Force Systems Command, Edwards Air Force Base, Calif.
DETERMINATION OF MIXTURES OF HYDRAZINE, 1-1-DIMETHYLHYDRAZINE AND DIETHYLENE TRIAMINE,
by Hugh E. Malone and Richard E. Barron. June 62, 9p. incl. illus. table, 9 refs.
(SSD TDR 62-41)
Unclassified report

DESCRIPTORS: *Hydrazines, *Methyl hydrazines, *Amines, *Chemical analysis, Ethylenes, Organic solvents, Methanols, Acetic acid, Salicylic acids, Aldehydes, Chemical reactions, Separation, Determination, Titration.

The total basicity of the mixtures of hydrazine, 1, 1-dimethylhydrazine and diethylene triamine is determined on two aliquots in acetic acid before and after the addition of salicylaldehyde, and one aliquot in methanol after the addition of salicylaldehyde. The method employs two independent solvent systems, titrants and indicators to determine the mixtures. In a methanol solvent system, salicylaldehyde forms a neutral azine with hydrazine, a neutral hydrazone with 1, 1-dimethylhydrazine, and a Schiff base with diethylene triamine in which only the secondary amino groups titrate as bases. In an acetic acid solvent system, salicylaldehyde forms a neutral azine with hydrazine, a basic hydrazone with 1, 1-dimethylhydrazine and a Schiff base with diethylene triamine in which all the amino groups titrate as bases. (Author)

AD-278 573 Div. 4
(TISTM/AW) OTS price $6.60

Naval Radiological Defense Lab., San Francisco, Calif.
VAPOR PRESSURES IN THE LIQUID SYSTEM Rb20-B203. DERIVED THERMODYNAMIC DATA AND A STRUCTURAL INTERPRETATION,
by C. E. Adams and J. T. Quan. 6 June 62, 66p. incl. illus. tables, 39 refs. (Rept. no. NRDL-TR-566)
Unclassified report

DESCRIPTORS: *Rubidium compounds, *Boron compounds, *Oxides, *Liquids, Vapor pressure, Thermodynamics, Measurement, Physical properties, Borates, High temperature research, Chemical reactions.

By use of the transpiration method, the vapor pressures of the liquid system Rb20-B203 between pure B203 and Rb20 . B203 were measured. The vapor over the entire composition range was an equimolar mixture of Rb20 and B203. Data from

from 3-300 rpm, the other from 1-60 rpm. A stabilized sweep is provided to permit operation on a moving vehicle. The antenna is circularly polarized and capable of receiving signals in the 1.0 kmc to 10.75 kmc frequency range. A major problem of interstage pickup was encountered and solved by the use of decoupling networks and some re-packaging. Vibration test results indicated the need for additional mechanical support. The power supply was repackaged and stiffening members added to pedestal A and the indicator unit. Re-tests proved these modifications adequate. (Author)

AD-278 696 Div. 6
(TISTW/DLW) OTS price $2.60

Naval Ordnance Lab., Corona, Calif.
PROPERTIES OF PHOTODETECTORS.
Photodetector Series rept. no. 51, Jan-May 62, by W. L. Eisenman, J. D. Merriam, and A. B. Naugle. 1 June 62, 30p. incl. illus. table (NOLC rept. no. 564)
Unclassified report

DESCRIPTORS: *Infrared detectors, *Infrared photoconductors, Blackbody radiation, Tests, Measurement, Indium compounds, Antimonides, Lead compounds, Selenides, Thermocouples, Signal-to-noise ratio, Sensitivity, Physical properties.

Results of measurements are presented for 12 photodetectors. Data sheets are included on lead selenide cells from the Eastman Kodak Company and the Santa Barbara Research Center; indium antimonide cells from the Philco Corporation; a Golay detector cell from the Eppley Laboratory, Inc.; and a thermocouple cell from the Perkin Elmer Corporation. Tests conducted on the Golay detector and the thermocouple cells deviated from the normal procedure in that the blackbody response was measured at 500, 10 rather than the usual 500, 90. (Author)

7. ELECTRICAL EQUIPMENT

AD-278 647 Div. 7
(TISTM/EJH) OTS price $2.75

Inland Testing Labs., Dayton, Ohio.
ALKALINE BATTERY EVALUATION.
Semi-annual rept. no. 3, 15 Oct 61-15 Apr 62, by W. W. Clark, W. G. Ingling, and I. F. Luke. June 62, 111p. incl. illus. table.
(Contract AF 33(616)7529, Proj. 8173)
(ASD TDR 62-553; Supersedes Technical rept. no. 62-68, AD-273 688) Unclassified report

DESCRIPTORS: *Storage batteries, *Power supplies, *Alkaline cells, *Wet cells, Electrolytic cells, Electrodes, Nickel compounds, Cadmium compounds, Potassium compounds, Electrolytes, Hydroxides, Materials, Electric discharges, Temperature, Failure (Mechanics), Tests, Design, Data, Satellite vehicles.

The purpose of this program is to establish a broad base of battery test data for use in the design of the electrical system of future space vehicles. To date, cycle-life tests have been conducted on one type of 12 ampere-hour, sealed nickel-cadmium cells in four temperature environments and four depths of discharge, in groups of 10 cells and in batteries of 20 cells. Initial results showed that: (1) Cell cycle-life with shallow discharges is considerably longer that cycle life at deep discharges and (2) Cycle-life is reduced by high and low ambient temperatures. (Author)

AD-278 722 Div. 7, 26, 8
(TISTE/CAM) OTS price $2.60

Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE TEMPERATURE-COMPENSATING CERAMIC CAPACITORS.
Quarterly rept. no. 4, 13 Mar-12 June 62, by J. H. Fabricius and W. F. Bell. 12 June 62, 18p. illus. tables.
(Contract DA 36-039-sc-85996)
Unclassified report

DESCRIPTORS: *Ceramic capacitors, *Subminiature electrical equipment, *Manufacturing methods, Materials, Ceramic materials, Electrostatic capacitance, Temperature, Sprays, Processing, Grinders, Paints, Test methods, Production.

Effort continued toward the selection of ceramic formulations for use in capacitors. Requirements were attained for the N750 and N1400 formulations. The temperature coefficient of capacitance for the NPO formulation has not yet been achieved. Two promising approaches to the solution of this problem are described. A recapitulation of the status of development of spraying capability on all three formulations is given along with a report on the latest work in the study of precoating ceramic powder. Problems in achieving satisfactory dipping coats are also discussed. Test results on the 128 Case Size 1 units undergoing qualification testing are given. Photographs of various finishing methods are also presented along with descriptions of improvements in the area. (Author)

AD-278 734 Div. 7, 14
(TISTM/EJH) OTS price $1.60

Westinghouse Electric Corp., Pittsburgh, Pa.
INORGANIC BINDERS FOR ''C'' CORES.
Progress rept. no. 5, 30 Mar-29 June 62, by J. Seidel and C. A. Eaves. 25 July 62, 9p. illus. tables (Research Labs. rept. no. 6243-46902-E)
(Contract NObsr-85304)
Unclassified report

DESCRIPTORS: *Magnetic cores, *Magnetic materials, *Binders, *Composite materials, Ceramic coatings, Glass, Sodium compounds, Zirconium compounds, Titanium compounds, Silicon compounds, Oxides, Bonding, Laminates, Steel, Thermal expansion, Manufacturing methods, Wire winding machines.

Sample cores were constructed with an inorganic binder by fusing a very thin layer of glass to the surfaces of magnetic steel strips and winding the composite until the required build-up was obtained. During the requisite stress relief anneal, a laminar bond between the adjacent glassy layers was accomplished. The binder, having a composition in the system $Na_2O.xRO_2.(3-x)SiO_2$, RO_2 being ZrO_2 and TiO_2, did not degrade the magnetic properties of the cores although it probably induced a residual tensile stress in the steel. Room temperature tests before aging were performed and the core loss and excitation values at 15 kilogausses are given. (Author)

AD-278 810 Div. 7, 12
(TISTW/DLW) OTS price $3.00

Radio Corp. of America, Lancaster, Pa.
THE DEVELOPMENT OF A LOW TEMPERATURE VAPOR FILLED

are scanned. Operation is over a temperature range of -40 to +65 C. The equipment is constructed with silicon transistors throughout. The copy is printed out by means of electromagnetic print heads applying pressure through a carbon overlay to white paper. (Author)

AD-278 711 Div. 5
(TISTP/TL) OTS price $.75

Arizona U., Tucson.
TWO NEW SPEECH COMMUNICATION SYSTEMS.
Final rept. for 15 Dec 60-14 Dec 61 on Biological Information Handling Systems and Their Functional Analogs,
by John L. Stewart. Mar 62, 22p. incl. illus. 29 refs.
(Contract AF 33(616)7800, Proj. 7233)
(MRL TDR 62-10) Unclassified report

DESCRIPTORS: *Psychoacoustics, *Information theory, *Radio communication systems, *Multiplex transmission, *Speech transmission, Multichannel telephone systems, Sidebands, Amplitude modulation, Delay lines, Functions, Differential equations, Integral equations, Modulation.

Two unrelated speech communication systems are described which provide certain efficiencies in speech channel usage. One system achieves the equivalent of modest bandwidth compression by permitting two-to-one time multiplexing with simple terminal equipment and with a standard speech (telephone) channel. The other, based on extraction of equivalent amplitude, frequency, and phase modulating components of speech, may yield bandwidth compression comparable to that of a formant-tracking vocoder. (Author)

6. DETECTION

AD-278 483 Div. 6, 12
(TISTW/RD) OTS price $7.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
A DESIGN CONCEPT OF THE CONTROL AND COMPUTATION EQUIPMENT FOR A SPADATS PHASED ARRAY RADAR,
by Frank C. Lisle and Stanley D. Davis. May 62, 72p. incl. illus. tables, 13 refs. (RADC TDR 62-161)
Unclassified report

DESCRIPTORS: *Radar tracking, *Radar scanning, *Satellite vehicles, Detection, Radar equipment, Digital systems, Digital computers, Control, Control systems, Data transmission systems, Design, Search radar.

A large track and scan phased array radar designed for space tracking and detection functions will require a control unit of considerable complexity. This report attempts to analyze in some depth, the problems and solutions of the control unit of such a radar. Digital handling of the information on the high density satellite population expected in the next decade is described as well as the reasons for the choice of various techniques used. Although there are other approaches, a large general purpose computer is considered for the controlling element in this report, and the logical flow charts are developed for this type of mechanization. (Author)

AD-278 575 Div. 6
(TISTW/RD) OTS price $3.60

Navy Underwater Sound Lab., Fort Trumbull, New London, Conn.
COLOSSUS II SHALLOW-WATER ACOUSTIC PROPAGATION STUDIES,
by R. W. Hasse, Jr. and R. A. Westervelt.
1 June 62, 30p. incl. illus. tables (USL rept. no. 550)
Unclassified report

DESCRIPTORS: *Underwater sound transmission, Underwater sound, Propagation, Acoustics, Statistical distributions, Mathematical prediction.

Project Colossus II was established in 1954 to investigate acoustics in shallow water (150 fathoms or less). A portion of the program was devoted to a study of underwater acoustic propagation. The frequency range of interest was 100 to 3000 cps. Presented are the results of the acoustic propagation loss studies, which include a summary of the analysis and a prediction method of estimating the statistical distribution of propagation loss. (Author)

AD-278 640 Div. 6, 25
(TISTW/DLW) OTS price $1.60

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
COMMENTS ON THE PROBLEM OF AN OPTICAL RADAR SYSTEM.
Technical rept. on Research on the Quantum Nature of Light, and Solid State Research and Properties of Matter,
by R. K. H. Gebel. June 62, 15p. incl. illus. 3 refs. (Rept. no. ARL 62-372)
(Projs. 7072 and 7021)
Unclassified report

DESCRIPTORS: *Lasers, *Light, *Radar, *Solid state physics, Signal-to-noise ratio, Airborne, Light transmission, Military requirements, Radar equipment, Reflection, Optical systems, Optical materials.

The need for optical radar equipment is discussed. The selection of the most suitable receiving system is analyzed and calculations for the requirements concerning the radiating source for such a system are computed. The usefulness of commercially available lasers is investigated. Solid state research providing new materials for laser-like devices is discussed. (Author)

AD-278 679 Div. 6, 8
(TISTW/DLW) OTS price $8.10

Litton Systems, Inc., College Park, Md.
DIRECTION FINDER GROUP AN/TLA-9 (XE-1).
Final rept., 1 July 60-28 Feb 62,
by J. DeStefano. 28 Feb 62, 48p. illus.
(Contract DA 36-039-sc-84961, Proj. 3E44-02-001)
Unclassified report

DESCRIPTORS: *Direction finding, *Radio interception, *Radar interception, *Parabolic antennas, Ultra high frequency, Superhigh frequency, L band, S band, X band, Bearing finding, Antenna hardware, Servo systems, Storage tubes, Display systems, Mobile, Design, Tests, Electronic circuits, Microwave equipment.

The design, fabrication, and testing of the AN/TLA-9 Direction Finder group was completed. The system consists of a memory type indicator unit capable of displaying signals of 0.1 microsecond width and 0.1 volt amplitude. The servo unit controls the operation of two pedestals, one

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-278 448 Div. 8, 25
(TISTW/DLW) OTS price $2.60

Microwave Lab., Stanford U., Calif.
MICROWAVE RESEARCH.
Quarterly status rept. no. 13, 1 Feb-30 Apr 62. June 62, 20p. incl. illus. (ML rept. no. 920)
(Contract Nonr-22548)
Unclassified report

DESCRIPTORS: *Microwaves, *Microwave equipment, *Microwave networks, Space charges, Frequency multipliers, Klystrons, Electron beams, Parametric amplifiers, Quantum mechanics, Nonlinear systems, Masers, Semiconductors, Ferrites, Propagation, Radiofrequency generators, Plasma physics, Electron tubes, Theory, Scientific research.

Contents:
General studies of space-charge waves
Transverse-wave frequency doublers
Klystron efficiency studies
Electron beam interaction theory
Parametric refrigeration
Nonlinear quantum effects
Theoretical maser research
An investigation of nonlinear effects in semiconductors
Ferrite nonlinear propagation
Generation of submillimeter wavelengths
Plasma harmonic generation

AD-278 449 Div. 8, 30
(TISTE/CRJ) OTS price $1.60

Bureau of Naval Weapons, Navy Dept., Washington, D. C.
PROGRESS IN MICROELECTRONICS,
by John A. Merz and Richard A. Retta. 15 Feb 62, 14p. incl. illus. (NAVWEPS rept. no. 7972)
Unclassified report

DESCRIPTORS: *Microminiaturization (Electronics), *Molectronics, *Naval research, Electronic circuits, Thin films, Semiconductors, Manufacturing methods, Analysis, Research program administration, Electronics.

The history of the microelectronics program is discussed, and the basic techniques used in the fabrication of circuits by thin-film and semiconductor methods are described. The primary objectives of the Bureau of Naval Weapons microelectronics program are defined in terms of progress in current projects. Future trends are covered very briefly. (Author)

AD-278 491 Div. 8
(TISTW/DLW) OTS price $3.60

Sperry Gyroscope Co., Great Neck, N. Y.
ANTENNA FOCUSING SYSTEM STUDY.
Quarterly technical note no. 3.
Mar 62, 31p. incl. tables (Rept. no. EB-5297-0147-3, vol. 2)
(Contract AF 30(602)2532, Proj. 5561)
(RADC TDR 62-229, vol. 2)
Unclassified report

DESCRIPTORS: *Antennas, Tables, Statistical analysis, Probability, Focusing.

AD-278 495 Div. 8
(TISTP/FR) OTS price $2.60

Smyth Research Associates, San Diego, Calif.
A STUDY OF MAGNETIC FIELD-ALIGNED SCATTER.
Quarterly progress rept. no. 9, Apr-June 62,
by J. L. Heritage, W. J. Fay, and E. D. Bowen.
July 62, 16p. incl. illus. (Rept. no. SRA-279)
(Contract AF 33(616)6991)
Unclassified report

DESCRIPTORS: *Ionospheric propagation, *Scattering, Radio waves, Ultra high frequency, Terrestrial magnetism, Airplanes, Antennas.

Final preparations for the UHF Caribbean propagation experiments are described. Flight tests and studies of the ground station antenna system completed the engineering preparations. The Panama and Curacao experiments will be performed next quarter. (Author)

AD-278 500 Div. 8
(TISTP/WH) OTS price $2.60

Technical U., Copenhagen (Denmark).
THE SKY-WAVE FIELD FROM A VERTICAL DIPOLE OVER AN INHOMOGENEOUS, FLAT EARTH CONSISTING OF TWO MEDIA,
by J. Bach Andersen. Oct 61, 27p. incl. illus. 10 refs. (Technical note no. 2)
(Contract AF 61(052)503)
(AFCRL 62-384)
Unclassified report

DESCRIPTORS: *Dipole antennas, *Radio waves, *Propagation, Integral equations.

The compensation theorem is applied to the problem of the sky-wave field from a vertical, electric dipole placed on an inhomogeneous, flat earth consisting of two media, one perfectly conducting and one having a finite conductivity. Several ways of approximating the problem are considered under the assumption that the dipole is several wavelengths from the boundary between the two media. Formulas and graphs are given, and it is shown that considerable gain can be achieved for low angles of elevation, when the dipole is placed on the finitely conducting medium close to the boundary of the perfectly conducting medium. (Author)

AD-278 521 Div. 8
(TISTP/FR) OTS price $1.25

Navigation and Guidance Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
LASERS FOR AEROSPACE WEAPONRY.
Summary rept. on Weaponization of Submillimeter Electromagnetic Technique,
by Janis Sirons. May 62, 42p. incl. illus.
(Proj. 5237)
(ASD TDR 62-440) Unclassified report

DESCRIPTORS: *Lasers, Optical systems, Radar, Collimators, Photomultipliers.

A summary of the state-of-the-art in Laser research is given. Characteristics of the present ruby laser are described and compared with idealized characteristics. Mathematical calculations of performance using existing and idealized parameters are performed. Research to improve existing lasers is described, including new crystal materials, new sources of optical energy, and new Lasering techniques. A program is outlined to direct future Laser research and apply the developments effectively. (Author)

Division 7 - ELECTRICAL EQUIPMENT

THERMIONIC CONVERTER.
Final rept., Jan 61-Jan 62,
by F. G. Block and J. J. O'Grady. June 62,
168p. incl. illus. tables, refs.
(Contract AF 33(616)7903, Proj. 3145)
(ASD TDR 62-324) Unclassified report

DESCRIPTORS: *Thermionic emission, *Power supplies, *Plasma physics, Gas ionization, Diodes, Triodes, Electrodes, Heat transfer, Cesium, Vapors, Ions, Materials, Life expectancy, Design, Electric power production, Spaceships.

The development of a low-temperature, plasma, thermionic converter is described. The converter uses a third electrode to ionize plasma so as to neutralize the space charge. The lower temperature thus achieved should significantly prolong the life of the converter and contribute to the development of a more reliable power supply for space application. Research was directed toward optimizing geometry and operating characteristics and investigating the effects of temperature and pressure, starting pulse, magnetic fields, and operation in both series and parallel circuitry. Materials were investigated to achieve practical electrodes by determining compatibility of material, atmospheric corrosion, and gas permeation. Converters were fabricated, evaluated, and life tested with the parameters optimized by the test program. (Author)

AD-278 816 Div. 7
(TISTW/RD) OTS price $1.60.

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HIGH-TEMPERATURE VAPOR-FILLED THERMIONIC CONVERTER.
Quarterly technical rept., 15 Mar-30 June 62,
by F. Carpenter, W. Godsin and others.
13 July 62, 14p. incl. illus. (Rept. no. GA-3330)
(Contract AF 33(657)8563, Proj. 3145; Continuation of Contract AF 33(616)7422)
Unclassified report

DESCRIPTORS: *Electric power production, *Power supplies, *Thermionic emission, Uranium compounds, Carbides, Zirconium compounds, Vacuum systems.

Research covers the work done on a bench test of an unclad thermionic converter. The objective is to produce an efficient, high-power-density, long-life thermionic power converter using a uranium-zirconium-carbide emitter and a high-temperature nickel collector. (Author)

again considered from the manufacturing research viewpoint. In the search, information was sought on design standards and procedures, on production methods and techniques, and on applications of the fabricated items. The present volume, which extends the search to the end of 1961, has four sections. Section 1 includes references to bibliographies, state-of-the-art summaries, and survey articles. Printed circuits, micromodule assemblies, high-density packaging, dot components, encapsulation, and electrical connections are found in Section 2. Microcircuits, thin films, integrated circuits, 2-D circuits, and solid-state devices are treated in Section 3. The results of a cursory search on methods of cleaning electronic components and assemblies appear in Section 4. (Author)

AD-278 637 Div. 8
(TISTE/CAM) OTS price $1.25

Ohio State U. Research Foundation, Columbus.
INVESTIGATION OF NEW SEMICONDUCTOR PHENOMENON.
Final rept. on Biophysics of Flight,
by James Hanlon. Apr 62, 46p. incl. illus. tables, 9 refs.
(Contract AF 33(616)8384, Proj. 7222)
(MRL TDR 62-3) Unclassified report

DESCRIPTORS: *Transistors, *Diodes, *Semiconductors, *Transistor amplifiers, Silicon, Design, Cathode followers, Circuits, Impedance, Voltage, Electrical properties, Measurement.

A number of silicon, grown-junction, diffused-base transistors were found which exhibit an abnormally high input impedance when used in the common collector amplifier circuit. These transistors are identified by peculiar notches which are found in their diode characteristics and by an increasing current gain at low injection levels. It is this latter phenomenon which is largely responsible for the abnormally high input impedance. These transistors were studied through their common emitter hybrid parameters. Ways of measuring these parameters and of measuring common collector amplifier input impedance are presented. An explanation for the unusual behavior of these devices is proposed. Its basis is a small but significant variation from the normal in the doping profile of the emitter junction which produces an accelerating field at very low injection levels. (Author)

AD-278 655 Div. 8
(TISTE/CAM) OTS price $2.60

Electro-Optical Systems, Inc., Pasadena, Calif.
TUNNEL EMISSION AMPLIFIER INVESTIGATION.
Interim engineering rept. no. 2, 1 Feb-30 Apr 62,
by L. E. Godycki. 10 May 62, 22p. incl. illus. tables (Rept. no. 2060-Q-2)
(Contract AF 33(657)7631)
Unclassified report

DESCRIPTORS: *Diodes, *Triodes, *Radiofrequency amplifiers, Design, Materials, Tantalum, Tantalum compounds, Oxides, Aluminum, Copper, Thin films, Silicon, Dielectrics, Electrostatic capacitance, Measurement, Processing, Evaporation, Electron beams, Electrical properties, Aging.

Investigations of the tunnel emission amplifier continued. Various diode and triode structures of tantalum, tantalum oxide, aluminum, and copper were prepared. The use of silicon thin films as a dielectric showed that with thin film silicon, a true diode may be formed. Capacitance measurements were made on diode structures prepared from tantalum, tantalum oxide, and gold or aluminum. These devices were not sufficiently stable to allow the determination of capacity for very thin films of tantalum oxide. Metallographic studies on these structures did provide evidence which indicated that the true current densities were higher than the calculated values. (Author)

AD-278 656 Div. 8
(TISTW/DLW) OTS price $2.60

Electronic Communications, Inc., Timonium, Md.
MILLIMETER WAVE RESEARCH,
by J. M. Cotton and M. Cohn. 31 May 62, 23p. incl. illus. 9 refs. (Technical note no. 4)
(Contract AF 30(602)2457, Proj. 4506)
(RADC TDR 62-287) Unclassified report

DESCRIPTORS: *Microwaves, *Microwave equipment, *Waveguides, Wave transmission, Transmission lines, Theory, Attenuation, Optics, Frequency multipliers, Ferrites, Electromagnetic wave reflections, Extremely high frequency.

Transmission systems for use in the submillimeter wavelength region were studied. An extension of the theoretical analysis of trough waveguide is given. The computed launching efficiencies using magnetic line source excitation are presented in normalized form. A discussion of oversized and highly overmoded waveguide structures is included. Theoretical attenuation characteristics for lossy wall and reflecting wall cases are compared. The present status of a measurement system for the submillimeter region is indicated. (Author)

AD-278 657 Div. 8
(TISTW/DLW) OTS price $5.60

Eitel-McCullough, Inc., San Carlos, Calif.
GENERATION AND SUPPRESSION OF SPURIOUS OUTPUTS IN KLYSTRON AMPLIFIERS,
by Raymond Cumming and George Caryotakis.
Mar 62, 42p. incl. illus. tables (Technical note no. 6)
(Subcontract to Electromagnetics Lab., Stanford Research Inst., Menlo Park, Calif., Contract AF 30(602)2392)
(RADC TDR 62-165) Unclassified report

DESCRIPTORS: *Klystrons, *Radiofrequency power, *Radiofrequency filters, *Radiofrequency spectrum analyzers, Broadband, Frequency multipliers, Distortion, Electronic circuits, Impedance, Cavity resonators, Tests, Frequency modulation, Radio interference, Measurement.

Spurious energy and distortion that can be generated by a klystron transmitter are discussed. Particular attention is devoted to harmonic generation, mutual intermodulation between two transmitters, and long-line distortion in FM transmitters. A method for designing a broad-band output circuit for klystrons was developed and a model was fabricated and tested. A theory is developed for the power radiated because of mutual intermodulation. Measured results are reported on the mutual intermodulation radiated power which agree satisfactorily with the theory. The degree of coupling of the load to the output cavity is discussed, as a means for controlling the value of a-c output-gap voltage. A plot of efficiency versus degree of coupling is shown superimposed on the gap current versus gap voltage curve. Some pertinent aspects of FM long-line distortion are appended. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-278 569 Div. 8
(TISTP/FR) OTS price $8.60

Electron Physics Lab., U. of Michigan, Ann Arbor.
THEORETICAL AND EXPERIMENTAL INVESTIGATION OF LARGE-SIGNAL TRAVELING WAVE TUBES.
Quarterly progress rept. no. 7, 1 Jan-1 Apr 62, by C. A. Brackett, S. K. Cho and others. Apr 62, 87p. incl. illus. tables (Rept. no. 03736-12-P)
(Contract AF 30(602)2303, Proj. 5573)
(RADC TDR 62-243) Unclassified report

DESCRIPTORS: *Traveling wave tubes, *Klystrons, *Electron guns, *Electron beams, *Waveguide couplers, *Space charges, Magnetrons, Functions, Numerical methods and procedures, Electric fields.

The calculation of space-charge weighting functions for a finite diameter electron beam are presented for both the axial and radial space-charge forces. New experimental results on variable-pitch helix traveling-wave tubes are presented and maximum efficiency figures of 45 percent are indicated. Results on X-band elliptic cavity couplers indicate that low VSWR and insertion loss can be achieved over very wide bandwidths both with coaxial lines and with waveguide coupling. Initial computer results on the potential distribution in a two-dimensional diode are presented and correlated with one-dimensional results. An expression for the electric field distribution in a beam-plasma interaction is presented which removes an earlier restriction to a constant relaxation time. (Author)

AD-278 571 Div. 8, 20
(TISTP/JW) OTS price $10.50

Heat Transfer Lab., U. of Minn., Minneapolis.
THERMODYNAMICS AND TRANSPORT PROCESSES IN MULTI-COMPONENT SYSTEMS.
Interim technical rept. on Mechanics of Flight, by Fran Bosnjakovic, tr. by H. A. Simon and E. R. F. Winter. May 62, 129p. incl. illus. refs.
(Contract AF 33(616)5528, Proj. 7063)
(ARL 62-359) Unclassified report

DESCRIPTORS: *Thermodynamics, *High temperature research, *Plasma physics, Combustion, Equilibrators, Shock waves, Re-entry aerodynamics, Boundary layer, Fluid flow, Theory.

A general introduction to thermodynamics is presented as a background for the subsequent discussions. Emphasis is on the thermodynamic concepts, instead of mathematical exposition. Equilibria phenomena with inclusion of radiation in high temperature systems are discussed extensively. A section on shock waves in plasmas is included. The analysis covers non-equilibria states in plasmas as well. The application of the principles discussed results in a wide variety of enthalpy-entropy diagrams for multi-component high temperature systems. The use of these h-s diagrams is explained in detail allowing their application to such engineering problems as re-entry and propulsion. Furthermore, their applicability to gas-surface reactions and for combustion problems is demonstrated. (Author)

AD-278 588 Div. 8
(TISTE/CAM) OTS price $3.60

Electronic Defense Labs., Mountain View, Calif.
NEAR FIELD MEASUREMENTS ON A LOGARITHMICALLY PERIODIC ANTENNA.
by Ross L. Bell, Claes T. Elfving, and Raymond E. Franks. 20 July 62, 35p. incl. illus. 10 refs. (Technical memo. no. EDL-M231)
(Contract DA 36-039-sc-78281)
Unclassified report

DESCRIPTORS: *Antennas, *Antenna radiation patterns, Measurement, Mathematical analysis, Electric currents, Electric fields, Electromagnetic waves, Transmission lines, Electrical properties, Standing wave ratios, Impedance, High frequency, Very high frequency, Ultra high frequency, Design, Test equipment, Test methods.

Near-field measurements on a triangular-tooth log periodic antenna reveal that two waves exist on the structure. A transmission line wave travels from the apex to the active region of the antenna and excites currents in the teeth in this region. These currents in turn launch a radiated wave which accounts for the far-field pattern characteristics of the antenna. The antenna is shown to exhibit a pronounced degree of increased directivity. Near-field measurements made through one period of operation show smooth variations of the field distributions with frequency. (Author)

AD-278 590 Div. 8
(TISTP/FR) OTS price $4.60

Keele U. (Gt. Brit.).
NEW METHODS OF ANALYSIS OF ELECTROPHYSIOLOGICAL RESPONSES.
Final technical rept., by Donald M. MacKay, D. Aled Jeffreys, and Richard R. Glover. 21 June 62, 24p. illus. 3 refs.
(Contract AF 61(052)364)
(AFOSR-3034)
Unclassified report

DESCRIPTORS: *Pulse modulation, *Recording systems, *Magnetic tape, Electroencephalography, Modulators, Detectors, Pulse generators, Pulse amplifiers, Pulse counters, Trigger circuits.

The development of a simple system for the averaging and analysis of repeated electrical signals is described. Samples are accumulated on a closed loop of magnetic tape, using a special form of pulse-interval modulation, designed also to enable simple circuitry to compute correlations. A low-speed and a high-speed multi-channel model have been developed, with capacities of up to 900 samples per channel. First results with the E.E.G. of human subjects exposed to patterned visual stimuli are described. (Author)

AD-278 631 Div. 8
(TISTB/AW) OTS price $2.50

Lockheed Aircraft Corp., Sunnyvale, Calif.
PRINTED CIRCUITS AND WELDED MODULES: AN ANNOTATED BIBLIOGRAPHY,
comp. by George E. Owens. Apr 62, 100p.
(Special bibliography no. SB-62-5; Rept. no. 3-35-62-1)
(Contract AF 04(647)787)
Unclassified report

DESCRIPTORS: *Bibliography, *Printed circuits, *Microminiaturization (Electronics), Circuits, Manufacturing methods, Design, Production, Packaging, Encapsulation, Thin films, Solid state physics, Electrical networks, Electrical equipment, Cleaning, Miniature electronic equipment.

This bibliography is a continuation of SB 61-52 (AD-271 035), 'Printed Circuits and Welded Modules: An Annotated Bibliography,' August 1961, with an expansion of the subjects to include microminiaturization of circuits and components,

AD-278 703 Div. 8, 25
(TISTE/CAM) OTS price $2.75

Purdue U. School of Electrical Engineering, Lafayette, Ind.
MICROWAVE ENERGY CONVERSION.
Rept. for Jan-July 61,
by E. M. Sabbagh. May 62, 137p. incl. illus. tables, 7 refs. (Rept. no. TR-EE-62-8)
(Contract AF 33(616)7355, Proj. 2566)
(WADD TR 61-48, pt. 3) Unclassified report

DESCRIPTORS: *Microwaves, *Semiconductors, *Diodes, *Rectifiers, *Subminiature electronic equipment, *Klystrons, Microwave frequency, Direct current, Full wave rectifiers, Microwave equipment, Electron guns, Theory, Fourier analysis, Series, Effectiveness, Dielectric properties, Resistance, Half wave rectifiers, Cavity resonators, Harmonic oscillators, Cathodes, Mathematical analysis, Magnetrons, Waveguides, Radiofrequency transformers, Frequency multipliers, Reliability, Electron guns, Microwave oscillators.

Rectification by semiconductor diodes: A relatively simple method was devised for mounting 680-1N830 diodes in a series parallel combination to form a single phase full-wave rectifier for operation at microwave frequencies. The efficiencies attained at 2440 mc are 70% for 9 watts output, 65% for 18.7 watts, 55% for 30.7 watts and 50% for 34 watts output. Conversion by Bulk semiconductor: An analytical study of bulk semiconductor conversion of microwave is presented. Direct rectification by hot cathode: Four different tube mounts were tested and their efficiencies obtained. These efficiencies vary with load resistors, the maximum values lying between 21 and 25% for all set-ups and for resistors between 2000 and 4000 ohms. (Author)

AD-278 705 Div. 8
(TISTW/DLW) OTS price $5.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
LOCATION OF HF RADIO STATIONS FROM THEIR FADING CHARACTERISTICS,
by Arthur E. Laemmel. 19 Oct 61, 57p. incl. illus. 11 refs. (Rept. no. PIBMRI-962-61; Scientific rept. no. 1)
(Contract AF 19(604)6154, Proj. 4691)
(AFCRL 62-79) Unclassified report

DESCRIPTORS: *Position finding, *Radio signals, *Ionospheric propagation, *Radio reception, High frequency, Bessel functions, Analysis of variance, Statistical processes, Amplitude modulation, Target recognition, Radio transmitters, Attenuation.

A method is described for obtaining complete or partial information concerning the location of a radio transmitter. Determination of the direction of arrival of the signal is not necessary, although such information would naturally improve the accuracy of the process. Observations are made at one receiving station of the fluctuations of carrier level of AM signals. The main emphasis has been on ionospherically propagated signals in the range 3-30 mc. The approach used is statistical, and is formally similar to other current projects which come under the heading of 'pattern recognition'. (Author)

AD-278 713 Div. 8, 12
(TISTW/DLW) OTS price $2.00

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT PROGRAM FOR MICROWAVE RADIATING POWER SOURCE FOR SPACE VEHICLE TELEMETRY TRANSMITTER.
Final rept., May 59-July 61,
by L. A. Roberts. June 62, 64p. incl. illus. tables.
(Contract AF 33(600)39392, Proj. 4107)
(ASD TR 61-711) Unclassified report

DESCRIPTORS: *Telemetering transmitters, *Microwave oscillators, *Traveling wave tubes, *Satellite vehicles, *Microwave amplifiers, Telemeter systems, Airborne, Electrostatics, Focusing, Helixes, Ultra high frequency, Electron guns, Space environmental conditions, Reliability, Design, Radiofrequency generators, Feedback amplifiers, Microwave equipment.

Research concerned the development of a voltage-tunable microwave oscillator for use as a space vehicle radiating power source. This device is built around an electrostatically-focused traveling-wave tube amplifer which can be designed to meet the various requirements of light weight, high efficiency, and long life required for space vehicle operation. It is made to function as a voltage-tuned oscillator by feeding-back a small fraction of its output power to its input through a microwave cavity. By using the phase shifting properties of the amplifier as a function of its beam voltage, the system exhibits a linear tuning curve. A discussion of various characteristics of electrostatic focusing is given and then it is compared to permanent magnet focusing. Measured operating performance of several tubes used as both amplifiers and oscillators is described and curves of power output, gain and efficiency are shown. A discussion of the problem of vacuum arcing associated with electrostatic focusing is given. Observations of various unexpected side effects to this focusing system are described. (Author)

AD-278 715 Div. 8
(TISTW/DLW) OTS price $2.60

Electromagnetics Lab., Stanford Research Inst., Menlo Park, Calif.
HF AND VHF NARROW-BAND FILTER CHARACTERISTICS,
by J. F. Cline. Feb 62, 23p. illus. (Technical note 5)
(Contract AF 30(602)2392)
(RADC TDR 62-185) Unclassified report

DESCRIPTORS: *Radiofrequency filters, *Bandpass filters, *Radio interference, High frequency, Very high frequency, Cavity resonators, Impedance, Design, Electrical properties, Coupling circuits, Waveguide couplers, Narrowband, Radio transmitters, Reduction.

Performance data are given for 2 experimental, high-power narrow-band, transmitter-output filters, one centered at 10 mc and the other at 300 mc, with particular emphasis on the insertion loss in the stop bands. The necessary compromises between selectivity, Q, center-frequency insertion loss, and the number of resonant circuits in a filter are discussed. (Author)

AD-278 716 Div. 8
(TISTE/CDM) OTS price $3.60

Electromagnetics Lab., Stanford Research Inst., Menlo Park, Calif.
COAXIAL ABSORPTION LEAKY-WAVE FILTER FOR HIGH POWER APPLICATION,
by Edward G. Cristal. Feb 62, 32p. incl. illus. 13 refs. (Technical note no. 4)
(Contract AF 30(602)2392)
(RADC TDR 62-184) Unclassified report

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-278 676 Div. 8
(TISTP/WH) OTS price $1.10

Diamond Ordnance Fuze Labs., Washington, D. C.
EXTRAPOLATION OF THE ELECTROMAGNETIC FIELD,
by John S. Wicklund. 2 July 62, 19p. 1 ref.
(Rept. no. TR-1058)

Unclassified report

DESCRIPTORS: *Electromagnetic fields, *Electromagnetic theory, *Wave transmission, *Green's function, Analog computers.

Given the shape of a pulse of electromagnetic radiation at a known distance from the source, an analytic expression is derived in the electric dipole approximation that yields the shape of the pulse at any other point. The technique uses the observed signal as a forcing function to obtain a Green function solution of the differential equation for the time behavior of the dipole moment. The result is useful as a check on machine computation and in those cases where the use of an analog computer is impractical. (Author)

AD-278 678 Div. 8, 12, 6
(TISTB/AW) OTS price $8.10

Lockheed Aircraft Corp., Sunnyvale, Calif.
R-F BLACKOUT PHENOMENA: AN ANNOTATED BIBLIOGRAPHY,
comp. by George R. Evans. Apr 62, 80p. (Special bibliography no. SB-62-18; Rept. no. 3-77-62-14)
(Contract AF 04(647)787)

Unclassified report

DESCRIPTORS: *Bibliography, *Radio interference, *Radio transmission, Radiofrequency, Radio communication systems, Radio fields, Radio waves, Radio signals, Space flight, Guided missiles, Re-entry vehicles, Atmosphere entry, Identification systems, Radar equipment, Theory, Guided missile tracking systems, USSR, Scattering, Electromagnetic waves, Electromagnetic wave reflections, Ionization.

This bibliography contains information on the theoretical and experimental studies of the causes of the R-F blackout phenomenon and possible solutions to the problem. The period covered is 1959 through February 1962. (Author)

AD-278 684 Div. 8
(TISTE/CAM) OTS price $4.60

Microwave Associates, Inc., Burlington, Mass.
HIGH POWER CAPABILITIES OF WAVEGUIDE SYSTEMS.
Quarterly progress rept. no. 5, 1 Feb-30 Apr 62,
by Meyer Gilden. 9 July 62, 24p. illus. tables, 4 refs.
(Contract NObsr-85190)

Unclassified report

DESCRIPTORS: *Waveguides, *Radiofrequency power, Design, Aluminum, Coatings, Electric fields, Pressure, Diffusion, Equations, Theory, Temperature, Measurement, Propagation, Reflection, Distortion, Impedance, Standing wave ratios, Electrical properties, Reliability, Microwave equipment, Handbooks, Microwaves, Wave transmission.

Measurements of electrical breakdown under conditions of high pressure are discussed. The linearity of the breakdown field strength with pressure was established up to 100 pounds per square inch for air. The physical factors which give rise to departures from linearity are indicated. Since diffusion lengths are important parameters for characterizing breakdown, a number of diffusion lengths are given for various waveguide configurations where, because of nonuniform fields, the diffusion length becomes a function of the parameter E/p. Some practical considerations are also included, such as the effect of distorted waveguide due to pressurization and the effect of an iridite coating. Further handbook information is presented for circular waveguide and also for tall rectangular waveguide. (Author)

AD-278 692 Div. 8
(TISTW/DLW) OTS price $9.60

Moore School of Electrical Engineering, U. of Pennsylvania, Philadelphia.
STUDY OF METHODS OF IMPROVED MEASUREMENT FOR ELECTROMAGNETIC FIELD COMPONENTS.
Final rept., 26 May 60-30 June 62,
by R. A. Bartfeld, R. Doviak and others.
31 July 62, 111p. incl. illus. 62 refs. (Rept. no. 62-19)
(Contract NBy-3200)

Unclassified report

DESCRIPTORS: *Electromagnetic fields, *Electromagnetic waves, *Loop antennas, *Dipole antennas, Detectors, Test equipment, Test methods, Errors, Linear systems, Mathematical analysis, Radiofrequency power, Density, Vector analysis, Measurement.

The near field measurement problem is described and analyzed in three stages. The inherent suitability of loops and dipoles for near field measurements is investigated. It is found that small loops and dipoles can be used as acceptable field indicators in many, but not necessarily all, near-field situations. The restrictions imposed on the use of loops and dipoles are derived. In particular, the interaction error is analyzed and computed for various cases of practical interest. Instruments utilizing loops and dipoles, applicable to near field measurements, are examined. Investigated in particular are the advantages and requirements of power density measurements in the near field. It is found that the measurement of the complex Poynting vector offers certain advantages compared to other power measurements in the near field. The effect of instrument errors is considered. (Author)

AD-278 699 Div. 8, 30
(TISTW/DLW) OTS price $5.60

Aeronautical Electronic and Electrical Lab., Naval Air Development Center, Johnsville, Pa.
INFORMATION ON MICROELECTRONICS FOR NAVY AVIONICS EQUIPMENT,
by H. B. Martin. 26 July 62, 52p. incl. illus. tables (Rept. no. NADC-EL-6251; Micro-Notes no. 1)

Unclassified report

DESCRIPTORS: *Microminiaturization (Electronics), *Packaged circuits, Airborne, Electronic circuits, Trigger circuits, Standardization, Tests, Reliability, Specifications, Digital systems, Digital computers.

Results of pertinent evaluations and general information on microelectronics are presented in newsletter form. The purpose of the newsletter is to promote the application of microelectronics in avionics equipment from technical information on evaluation, application, research and development, availability of microelectronic hardware, and standardization activities. (Author)

DESCRIPTORS: *Semiconductors, *Resistors, *Manufacturing methods, Metal films, Crystals, Single crystals, Chemical impurities, Resistance, Electrical properties, Vapor plating, Diffusion, Silicon, Ceramic materials, Aluminum compounds, Oxides, Gallium, Gold alloys, Sliding contacts, Temperature, Processing, Packaging, Test methods, Materials, Sheets.

Progress is reported on work performed on vapor-deposited silicon elements and diffused silicon elements with respect to improvement of ohmic contacts, increased sheet resistivity, and methods of adjustment. The lowest temperature coefficient of resistance seen thus far, approximately ± 150 ppm over the temperature range -55 to +150 C, was exhibited by vapor deposited polycrystalline elements on ceramic substrates. Tentative load-life data are presented to give some indication of resistance stability. (Author)

AD-278 731 Div. 8
(TISTE/CDM) OTS price $8.60

Technische Hochschule, Graz (Austria).
THEORETICAL STUDIES ON TAHA-ANTENNAS AND SURFACE WAVE LAUNCHERS,
Final technical rept., 1 July 60-30 June 61,
by Ernst Ledinegg. 30 June 61, 1v. incl. illus. tables.
(Contract DA 91-591-EUC-1514)
Unclassified report

DESCRIPTORS: *Antenna horns, *Antenna radiation patterns, *Transmission lines, *Antennas, Waveguides, Mathematical analysis, Reflection, Wire screens, Austria, S band, Theory, Conical antennas, Slot antennas, Integral equations, Numerical analysis, Wire, Partial differential equations, Cylindrical bodies, Radio waves.

Contents:
TAHA project
The reflection factor of the TAHA
Influence of a finite aperture screen on the radiation field
Excitation of the 60 degrees TAHA by higher modes
Radiation pattern of the TAHA with sector angles
Comparison of theoretical with experimental results
G-line project
Symmetry properties of the solution .
Explicit representation of the radiation field
The surface wave on the G-line excited by the aperture field
The eta-eta* factor and its minimizing (optimal values of the coefficients C sub nu)
The aperture field of the step-line and the step-horn respectively
The far-zone field of the step-horn and eta-eta* factor
Numerical assumptions and the choice of Z sub s

AD-278 745 Div. 8
(TISTP/WH) OTS price $3.60

Mathematics Research Center, U. of Wisconsin, Madison.
MULTIPLE SCATTERING OF PLANE WAVES BY TWO ELLIPTIC CYLINDERS,
by N. Zitron. May 62, 31p. incl. illus. 21 refs.
(MRC Technical summary rept. no. 316)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Scattering, *Electromagnetic waves, *Bodies of revolution, *Diffraction.

The multiple scattering is treated of plane waves by two identical infinite, widely spaced, parallel elliptic cylinders in the case where the major axes are parallel and the minor axes collinear and vice-versa. The results obtained provide some idea of the nature of the interaction terms in the fields scattered by combinations of cylinders. They show how the Mathieu function solutions of the individual cylinders are modified when the individual solutions for the two cylinders are combined. They also indicate the possible application of a combination of elliptic cylinders as a wave filter since the cylinders select different kinds of Mathieu functions to be multiply scattered according to the relative orientations of the major axes. (Author)

AD-278 817 Div. 8, 7
(TISTE/CDM) OTS price $2.60

General Electric Co., Schenectady, N. Y.
EVALUATION OF A MOLYBDENUM EMITTER, LOW VOLTAGE ARC THERMIONIC POWER CONVERTER.
Quarterly technical progress rept. no. 1, 26 Mar-15 June 62,
by E. A. Baum. Aug 62, 22p. incl. illus. (Rept. no. R-606 Q-1)
(Contract AF 33(657)8323)
Unclassified report

DESCRIPTORS: *Thermoelectricity, *Cesium electron tubes, *Cathodes (Electron tubes), *Electric power production, Molybdenum, Test equipment, Life expectancy, Deterioration, Design, Electric arcs, Electric discharges, Manufacturing methods, Thermionic emission.

Work was initiated to define and minimize the life limiting and degradation factors affecting the usefulness of the low-temperature cesium vapor converter. Basically, work is directed toward a life test evaluation of a state-of-the-art planar cesium vapor thermionic converter. It is the goal to arrive at a technical specification for a state-of-the-art vapor converter utilizing a molybdenum cathode. Generally, the program will consist of four major activities: (1) fabrication and life test of the state-of-the-art designs; (2) determination of the limiting factors; (3) the acquisition of operational data; and (4) the supply of vapor converters to ASD for further test and evaluation. The design of the life test equipment was completed and fabrication started. Six converters have been built and preliminary tests have been made on one device. A vacuum test station is being revised for taking operational and transient data. In order to expedite operational data acquisition, instantaneous viewing of the volt-ampere characteristics will be used. (Author)

AD-278 820 Div. 8, 26
(TISTE/CAM) OTS price $3.60

General Electric Co., Irmo, S. C.
SOLID TANTALUM CAPACITOR.
Quarterly engineering rept. no. 4, 1 Apr-30 June 62,
comp. by Archie Broodo. 30 June 62, 34p. incl. illus. tables, 1 ref.
(Contract NObsr-85470)
Unclassified report

DESCRIPTORS: *Tantalum capacitors, *Electrolytic capacitors, *Manufacturing methods, Design, Processing, Diffusion, Chemical analysis, Chemical impurities, Surface properties, Electrical properties, Voltage, Anodes (Electrolytic cell), Iron alloys, Tantalum, Sintering, Foamed metals, Tests.

Carbon analysis equipment was placed in service and carbon analysis made for several types of experiments including change of apparent carbon content during formation in various electrolytes.

DESCRIPTORS: *Waveguide filters, *Waveguide slots, *Waveguide couplers, *Coaxial cables, *Radiofrequency filters, Radiofrequency power, Waveguides, Voltage, Standing wave ratios, Tests, Measurement, Broadband, Coupling circuits, Microwave frequency.

Experimental data related to the design of a coaxial absorption leaky-wave filter are presented. Power coupling coefficients of rectangular slots, dumbbell slots, and various slot combinations which couple a coaxial-line to a side waveguide, are determined. The effects on slot coupling of the dimensions of the side waveguide, and of a load mismatch in the side waveguide are investigated. An experimental coaxial leaky-wave filter and two modifications of this filter were constructed and tested for insertions loss and VSWR for a TEM wave over a 10:1 frequency band. (Author)

AD-278 717 Div. 8
(TISTE/CDM) OTS price $8.10

Electromagnetics Lab., Stanford Research Inst., Menlo Park, Calif.
THE DESIGN OF BRANCH GUIDE DIRECTIONAL COUPLERS FOR LOW AND HIGH POWER APPLICATIONS,
by Leo Young. Feb 62, 77p. incl. illus. tables, 19 refs. (Technical note no. 3)
(Contract AF 30(602)2392)
(RADC TDR 62-130) Unclassified report

DESCRIPTORS: *Waveguide couplers, *Transmission lines, *Coupling circuits, Radiofrequency power, Mathematical analysis, S band, L band, Waveguide filters, Design, Microwave frequency.

A design method for branch-guide couplers was developed which gives close to optimum performance over a given pass-band. The method was tested by analyzing the performance of several numerical designs, then constructing two couplers in waveguide and comparing the actual with the computed characteristics. The agreement was close. The design procedure is facilitated by a new chart constructed for this purpose; alternatively, most practical cases can be worked out from the tables by interpolation. The 0-db branch-guide coupler has been used as a harmonic pad (that is, a harmonic absorber in front of a harmonic rejection filter). Measurements to date have been confined to the TE10 mode, for which the padding achieved should be adequate for most practical purposes. A VSWR of better than 2:1 has been obtained at all harmonic frequencies up to the eleventh harmonic. The absorption of spurious frequencies improves as the frequency increases. The L-band 0-db coupler has passed over 5 megawatts of peak power in air at atmospheric pressure without any sign of arcing. (Author)

AD-278 718 Div. 8
(TISTW/DLW) OTS price $2.60

Electromagnetics Lab., Stanford Research Inst., Menlo Park, Calif.
A HIGH-POWER WIDE-BAND WAFFLE-IRON FILTER,
by Eugene Sharp. Jan 62, 21p. incl. illus. table, 8 refs. (Technical note. no. 2)
(Contract AF 30(602)2392)
(RADC TDR 62-183) Unclassified report

DESCRIPTORS: *Low-pass filters, *Waveguide filters, *Waveguides, L band, Radiofrequency power, Impedance matching, Wave transmission, Radiofrequency attenuators, Design, Tests, Radiofrequency filters.

The design and measured performance are described of an L-band model of a high-power wide-band low-pass waffle-iron filter. Three different waffle-iron filters with staggered stop bands are connected in series to give a combined stop-band which extends from 2.2 gc to 13.7 gc where the attenuation is 60 db or greater; this stop-band includes the second through tenth harmonic of frequencies in the pass-band of 1.25 gc to 1.35 gc. The waffle-iron filter attenuates all waveguide modes which can propagate at frequencies in the above stop-band. In the pass-band, the waffle-iron filters are matched to full-size L-band waveguide using quarter-wavelength stepped transformers. The pulsed power handling capacity without breakdown is measured to be 1.4 megawatts peak power with air at atmospheric pressure filling the filter; the power capacity is measured using pulses 2 microseconds long and a repetition rate of 60 pulses per second. (Author)

AD-278 719 Div. 8
(TISTE/CAM) OTS price $7.60

Electromagnetics Lab., Stanford Research Inst., Menlo Park, Calif.
TECHNIQUES FOR THE SUPPRESSION OF SPURIOUS ENERGY.
Final rept., 29 Nov 60-28 Feb 62,
by L. Young, E. G. Cristal and others. Mar 62, 67p. incl. illus. tables, 4 refs.
(Contract AF 30(602)2392)
(RADC TDR 62-164) Unclassified report

DESCRIPTORS: *Radiofrequency power, *Bandpass filters, *Klystrons, *Waveguide filters, Radio transmitters, Waveguides, Waveguide couplers, Waveguide slots, Microwave frequency, L band, Impedance, Measurement, Standing wave ratios, Radiofrequency filters, Electronic equipment, Coaxial cables, Ultra high frequency, Very high frequency, High frequency, Distortion, Frequency multipliers, Interference.

A summary is given of results obtained under a 14-month study on high-power filter techniques to suppress the radiation of spurious frequencies from high-power sources. Detailed technical information on the various topics summarized is contained in a series of six technical notes. The filters described cover the HF, VHF, UHF, and microwave frequency bands. At least one filter in each band was constructed and experimental results are given. A harmonic power sampler was used to measure the harmonic content in the power output of the Eimac X-812 klystron. The second and third harmonics were each about 40 db below the fundamental; the fourth, fifth, and sixth harmonics were about equally strong, each being about 60 db below the fundamental power output. Spurious energy and signal distortion that can be generated in a klystron transmitter were investigated. Particular attention is devoted to harmonic generation, mutual intermodulation between two transmitters, and long-line distortion in FM transmitters. (Author)

AD-278 729 Div. 8, 26, 25
(TISTE/CAM) OTS price $3.60

Texas Instruments, Inc., Dallas.
SEMICONDUCTOR RESISTIVE ELEMENT.
Quarterly rept. no. 4, 1 Apr-30 June 62,
by Rodger B. Herrington, Olin B. Cecil, and Raymond D. Puckett. 30 June 62, 1v. incl. illus.
(Contract NObsr-85406)
Unclassified report

AD-278 423 Div. 9
(TISTA/VGW) OTS price $4.60

Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala.
THE EFFECT OF LOW ASPECT RATIO RECTANGULAR AND DELTA CRUCIFORM FINS ON THE STABILITY OF BODIES OF REVOLUTION WITH TANGENT OGIVES AT SMALL ANGLES OF ATTACK THROUGH A MACH NUMBER RANGE OF 0 TO 3.5,
by Clark De Jonge. 2 July 62, 39p. incl. illus. tables, 7 refs. (Rept. no. RF-TR-62-1, rev. supersedes AD-276 810)
Unclassified report

DESCRIPTORS: *Cylindrical bodies, *Bodies of revolution, *Conical bodies, *Fins, Pitch, Roll, Stability (Longitudinal), Mathematical prediction, Effectiveness, Supersonics, Cruciform wings, Aerodynamics, Stabilization, Aspect ratio.

Theoretical and experimental data are combined to provide an easy method of estimating the static and dynamic stability of cylindrical bodies with tangent ogives nose shapes in combination with low aspect ratio cruciform fins. (Author)

AD-278 484 Div. 9, 25, 30
(TISTP/WH) OTS price $2.60

RAND Corp., Santa Monica, Calif.
PROPORTIONS OF PRESSURE-VESSEL HEADS DESIGNED FOR MINIMUM WEIGHT BY THE MISES YIELD CRITERION,
by George A. Hoffman. June 62, 21p. incl. illus. tables, 5 refs. (Research memo. no. RM-2885-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Pressure vessels, *Stresses, *Tensile properties, Design, Mathematical analysis, Plasticity.

The minimal-weight shapes of head closures for long cylindrical pressure vessels, such as rocket tanks and pressurized fuselages, are derived. Head geometries, weights, and stresses are calculated for thin-shell heads of isotropic materials with uniform internal pressure by restricting tensile stresses to the plasticity ellipse--the limiting curve of yielding. Ellipsoidal and torispherical domes of varying thickness are derived by considering membrane stresses only, these highly efficient shapes being shallower and weighing up to 15 per cent less than the corresponding hemispherical capping closure. The least-weight ovaloid shape that avoids discontinuity stresses near the cyliner-dome juncture is evaluated, and it appears that the choice of head shapes based on this last criterion leads to heads that are heavier and deeper than pure membrane shapes that have the additional shell thickness required by the juncture stresses. (Author)

AD-278 485 Div. 9
(TISTP/WH) OTS price $1.60

RAND Corp., Santa Monica, Calif.
NOTE ON AN AXIALLY SYMMETRIC EXPANSION BEHIND A BODY IN HYPERSONIC FLOW,
by Richard E. Meyer. June 62, 13p. incl. illus. 2 refs. (Research memo. no. RM-2929-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Bodies of revolution, *Hypersonic flow, *Fluid mechanics, *Axially symmetric flow, *Condensation trails, Wake.

The flow near the rim of the flat base of a body of revolution is studied to establish the effect which axial symmetry has on the expansion process taking place there. It is shown that this effect decreases markedly with increasing flight Mach number. The pressure gradient and streamline curvature at the rim of the base are calculated, since they would be required for any detailed computations concerning the back pressure. (Author)

AD-278 486 Div. 9, 1
(TISTA/VGW) OTS price $11.00

RAND Corp., Santa Monica, Calif.
THE DESIGN AND TEST AT MACH NUMBER 2.5 OF TWO LOW-WAVE-DRAG RING-WING CONFIGURATIONS OF ASPECT RATIO 1.3 AND 2.6,
by Frederick K. Browand, Beverly J. Beane, and Daniel T. Nowlan. June 62, 131p. incl. illus. tables, 37 refs. (Research memo. no. RM-2933-PR)
(Contract AF 49(638)700, Proj. RAND; In cooperation with Massachusetts Inst. of Tech., Cambridge)
Unclassified report

DESCRIPTORS: *Ring wings, *Wing-body configurations, Design, Wind tunnel models, Shock waves, Drag, Lift, Pitch, Moments, Aerodynamic configurations, Tests, Supersonics, Model tests.

An approximate scheme for the design of ring-wing configurations which have almost no supersonic wave drag (at zero angle of attack and design Mach number 2.5) is described. This method is based on the Whitham correction to linearized small-perturbation theory. Wind-tunnel tests of two configurations designed by this method tend to verify the predicted wave-drag reduction. Discrepancies with the theoretical calculations are due mainly to their assumption of inviscid, isentropic flow. It appears probable that the design method could be improved by allowing for boundary-layer growth and for shock formation. The results of measurements of the lift, drag and pitching moment of the test models at angle of attack are included. All tests were conducted at the design Mach number 2.5. Whenever possible, the measured results are compared with theoretical predictions and the agreement is generally good. The presence of the horizontal pair of the cruciform struts and the body served to reduce the lifting drag factor of the complete configuration about 10 per cent from that of the ring wing alone. The necessary struts can be designed so that their drag is of the order of 5 per cent of the configuration drag. (Author)

AD-278 487 Div. 9, 25
(TISTA/WAW) OTS price $4.60

RAND Corp., Santa Monica, Calif.
ON THE PROPAGATION OF AERODYNAMIC DISTURBANCES FAR FROM A BODY RISING THROUGH THE ATMOSPHERE,
by Richard E. Meyer. June 62, 35p. incl. illus. 5 refs. (Research memo. no. RM-2927-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Upper atmosphere, *Shock waves, Pressure, Perturbation theory, Partial differential equations, Density, Gravity, Aerodynamics, Sound transmission, Acoustics, Wave transmission.

The far field of a body rising vertically at supersonic speed is studied through the acoustic approximation to obtain an insight into the effect which the atmospheric density stratification has on the propagation of the shocks and pressure waves generated by the body. Apart from the density stratification per se, the gravitational

Mass spectrometer type qualitative analyses are shown for gases evolved during anodization in different electrolytes. Doping experiments on high purity tantalum were begun. Work with carbon and iron is reported with metallographic and microhardness results shown. A brief description is given of experiments with anodes made in a range of densities. Compacting studies and die lubricant evaluations were completed. The extreme importance of surface cleanliness and ways of showing the effects of unclean surface conditions are reported. A voltage capability test method is reported for determining ability of anodes for use in 100 vdc solid capacitors. Calculations based on physical characteristics of anodes along with electrolyte character show the need for certain anode structures. Processing methods for 100 vdc solid capacitors were chosen for use in pilot production of the samples. (Author)

AD-278 824 Div. 8, 25, 30
(TISTE/CAM) OTS price $1.50

Westinghouse Electric Corp., Elmira, N. Y.
FEASIBILITY OF THE USE OF HOLLOW CATHODES FOR THERMIONIC ENERGY CONVERSION.
Final rept., 1 Mar-30 Nov 61,
by I. Brodie and A. Niewold. June 62, 48p. incl. illus. tables, 29 refs.
(Contract AF 33(616)7912, Proj. 3145)
(ASD TR 61-723) Unclassified report

DESCRIPTORS: *Cathodes (Electron tubes), *Thermionic emission, *Electricity, Thermoelectricity, Heat, Electron beams, Blackbody radiation, Space charges, Feasibility studies, Theory, Anodes, Diodes, Tungsten, Materials, Processing, Design, Temperature, Voltage, Measurement, Mathematical analysis.

Theoretical and experimental studies are reported to determine the feasibility of applying electron blackbodies to thermionic energy conversion. The conclusion is that the size of the effusing hole is governed largely, not by the size of the cavity to which it is the exit, but by the physical limitations imposed by the nature of the electron atmosphere within the cavity. It is shown that the density of the electron atmosphere within the cavity is only large in a region close to the surface of the emitting walls and may be characterized by a parameter d, which does not depend on the size of the cavity. A quantitative expression is given for the conditions under which the effusing hole behaves as an electron blackbody. It is shown that for the electron emission density to be large enough for useful thermionic energy conversion, the size of the effusing hole has to be too small for practical consideration. (Author)

AD-278 828 Div. 8, 25
(TISTE/CDM) OTS price $3.60

Litton Electron Tube Corp., San Carlos, Calif.
HIGH PERVEANCE GUN STUDY.
Quarterly rept. no. 4, 1 Mar-1 June 62,
by R. D. Harris, J. R. Hechtel, and Gerold E. Pokorny. 15 June 62, 32p. incl. illus. table.
(Contract DA 36-039-sc-87313)
Unclassified report

DESCRIPTORS: *Electron guns, *Electron beams, Magnetrons, Focusing, Tests, Cathodes (Electron tubes), Electrostatics, Magnetic fields, Electric currents, Voltage, Space charges, Particle trajectories, Electrons, Electron accelerators.

Research continued on the formation of stable and well-focused, high-perveance, large diameter, hollow-beams. Both magnetron injection-type guns and Pierce-type gun derivatives are being investigated. Test results are given for two magnetron injection guns. One gun, less than 2 cm in diameter, was designed to check axial cathode loading. Results concerning the second gun (5 cm diameter cathode) are compared to results of computer electron calculations. The electron motion in a magnetron injection gun as calculated by electronic computer, with particular emphasis on the rotational trajectory is presented. These results are correlated with some test data. Some preliminary test data are given for the electrostatic hollow-beam gun. (Author)

AD-278 844 Div. 8
(TISTE/CDM) OTS price $2.75

Thermo Electron Engineering Corp., Waltham, Mass.
AN EVALUATION OF A CESIUM MAGNETIC TRIODE.
Final rept., Apr 61-June 62,
by E. N. Carabateas, G. Miskolczy, and A. Wolpert. June 62, 130p. incl. illus. tables, 3 refs. (Rept. no. TEE-4011-15)
(Contract AF 33(616)8204)
(ASD TDR 62-598) Unclassified report

DESCRIPTORS: *Cesium electron tubes, *Triodes, Electric currents, Electric fields, Magnetic fields, Electron accelerators, Theory, Design, Mathematical analysis, Manufacturing methods, Ionization, Tests, Thermionic emission.

General equations are derived for a magnetic triode and design parameters are obtained. Experimental models were constructed with provisions to vary parameters. The models were fabricated using all metal-ceramic components to achieve uniform test conditions and to demonstrate the extent to which a device incorporating the magnetic triode features can be made practical both from the point of view of ruggedness and that of adaptability to a heat source. Extensive experimental results are obtained in an ignited and in an unignited mode. An analysis of the experimental results is presented. (Author)

9. FLUID MECHANICS

AD-278 402 Div. 9, 1
(TISTA/VGW) OTS price $9.60

Georgia Inst. of Tech., Atlanta.
TABLES FOR COMPUTING THE INSTANTANEOUS VELOCITIES INDUCED AT THE BLADE AXES OF A LIFTING ROTOR IN FORWARD FLIGHT BY THE SKEWED HELICAL WAKE VORTICES AND A METHOD FOR CALCULATING THE RESULTANT BLADE AIR LOADS,
by Walter Castles, Jr. and Howard L. Durham, Jr. June 62, 115p. incl. illus. tables, 4 refs.
(Contract Nonr-99105)
Unclassified report

DESCRIPTORS: *Helicopter blades, *Aerodynamics, *Fluid flow, *Helicopter rotors, Load distribution, Air foils, Mathematical analysis, Tables, Vortices, Velocity.

Tables are presented for computing the instantaneous velocities induced at the blade axes of lifting rotors having 1, 2, 3, or 4 blades operating in forward flight. An example of the application of the results used to calculate blade air load distributions is given. Comparison is made with experimental flight test data. (Author)

DESCRIPTORS: *Laminar boundary layer, *Sheets, *Magnetohydrodynamics, *Magnetic fields, *Drag, *Friction.

A theoretical investigation of an incompressible, magnetohydrodynamic laminar boundary layer on a flat plate has been conducted for an external flow which has uniform shear. The effects of free-stream vorticity and an applied magnetic field have been linearized using the assumption that both the vorticity number and a magnetic parameter were small. Theoretical expressions for the velocity profiles and skin friction were found. The skin friction consists of three parts - the Blasius skin friction, a magnetic drag, and a contribution caused by the free-stream shear. (Author)

AD-278 726 Div. 9, 31
(TISTP/WH) OTS price $4.60

Technical Research Group, Syosset, N. Y.
COMPARISON OF TWO APPROXIMATE DIPOLE DISTRIBUTIONS FOR A LENTICULAR CYLINDER IN A SEMI-INFINITE FLUID,
by J. Kotik and V. Mangulis. 15 Feb 62, 1v. incl. illus. table, refs. (Rept. no. TRG-119-SR-2; Scientific rept. no. 2)
(Contract Nonr-242700)
Unclassified report

DESCRIPTORS: *Fluid mechanics, *Bodies of revolution, *Ship hulls, *Hydrodynamics, Resistance, Ocean waves, Integration.

The exact and linearized dipole distributions generating lenticular cylinders in an infinite fluid are compared for various values of a fullness parameter. These dipole distributions are approximations to the exact dipole distribution generating a (vertical) lenticular cylinder in the presence of a free surface. Each dipole distribution has a wave resistance, the wave resistance of the linearized dipole distribution being Michell's wave resistance for the lenticular cylinder. For practical values of a fullness parameter, the two approximate dipole distributions are not very close, and for Froude numbers around .4 the wave resistances may differ by as much as 40%. This difference is larger than the uncertainty in the measured wave resistance. If Michell's dipole distribution for an arbitrary form is modified in an ad hoc but natural way suggested by the results for lenticular cylinders, a comparison with existing measured wave resistance can be carried out. Similar remarks apply to the asymptotic behaviour of the wave resistance at low speed. (Author)

AD-278 834 Div. 9, 25
(TISTP/WH) OTS price $3.60

Ohio State U. Research Foundation, Columbus.
THE MOLECULAR FLOW OF DIATOMIC GASES AND GAS MIXTURE.
Rept. on Research in Techniques in Aero Mechanics,
by John D. Lee. May 62, 25p. incl. illus. 5 refs.
(Contract AF 33(616)5593, Proj. 7065)
(ARL 62-346) Unclassified report

DESCRIPTORS: *Gas ionization, *Gas flow, *Hypersonic flow, *Continuum mechanics, *Molecules, Partial differential equations, Rotation.

An equilibrium energy distribution function including rotation is considered for a diatomic molecular gas and found to be consistently correct in generating continuum equations from a general transport equation. The model is used to examine hypersonic free-molecular flows of a diatomic gas where alterations from the equations of monatomic flows are found in temperature terms of the energy transfer relation. Such terms are not negligible even at orbital speeds and should not be neglected in analyses. The case of a gas mixture (continuum) is treated from a molecular viewpoint using a transport relation for the molecular mixture. The analysis deals with a diatomic-monatomic mixture and then generalizes the results to formulate specific heats and their ratio for any non-reacting mixture. (Author)

AD-278 837 Div. 9, 25, 12
(TISTP/JW) OTS price $7.90

Plasmadyne Corp., Santa Ana, Calif.
J x B MAGNETOHYDRODYNAMIC (MHD) WORKING FLUIDS.
Final rept.,
by Meredith C. Gourdine. Apr 62, 71p. incl. illus. 57 refs.
(Contract AF 33(616)8173, Proj. 3048)
(ASD TDR 62-259) Unclassified report

DESCRIPTORS: *Magnetohydrodynamics, *Fluid mechanics, *Accelerometers, Argon, Induction systems, Rocket propulsion, Series, Equilibrators, Fluid flow, Literature, Plasma physics, Bibliography, Propulsion.

A literature survey covering the three types of MHD propulsors (shunt, series, induction) is provided. A theory suitable for analyzing the performance of the steady J x B accelerator is developed. The performance of various working fluids is determined using the criterion of maximum propulsion efficiency. Two broad classes of working fluids are considered: equilibrium plasmas, and non-equilibrium plasmas. Non-equilibrium plasmas have the advantage of good performance without high temperature materials problems. A conductivity of 170 mhos/m in argon has been experimentally produced and measured in a 'ring' discharge at a pressure of 1 mm of Hg with a power input of approximately 1 kilowatt. A temperature of over 5,000 K is required to do this thermally. (Author)

10. FUELS AND COMBUSTION

AD-278 482 Div. 10, 4
(TISTM/JSM) OTS price $4.60

Rocketdyne, Canoga Park, Calif.
RESEARCH IN FLUORINE CHEMISTRY.
Quarterly progress rept. no. 18, 16 Mar-15 June 62,
by H. H. Rogers, J. H. Johnson, and S. Evans. 15 July 62, 34p. incl. illus. tables, 7 refs.
(Rept. no. R-334-18)
(Contract Nonr-181800)
Unclassified report

DESCRIPTORS: *Fluorine, *Fluorides, *Electrolysis, *Rocket oxidizers, Electrolytic cells, Solubility, Synthesis, Tetroxides, Oxides, Nitrogen compounds, Hydrogen compounds, Oxyfluorides, Polarization, Oxygen compounds, Materials.

The electrochemistry of the HF-N2O4 and HF-NO systems and its relationship to the synthesis of oxygen-fluorine compounds is discussed. The effect of electrode passivation on polarization was found to be particularly important. The synthesis of NO3F or of OF2 in the HF-NO system has been found to depend upon electrode passivation; conditions for the synthesis of both components were established. The electrolysis of HF-N2O (NaF) was found to yield NF3 as a product.

acceleration is found to have a major influence when the waves are followed over heights of several miles or more. The absolute pressure and density perturbations due to the body decrease with height while the velocity and particle displacement increase. The decay of the perturbation behind the shock is oscillatory, in contrast to its monotonic character in a uniform medium. At any point at considerable height and distance from the flight path, the air will experience a sudden, surprisingly large, upward and outward displacement, followed by a reversal and oscillatory decay in time. The natural decay of the perturbation with distance from the body is counteracted by certain effects. The acoustic results obtained usually give a reliable picture of the wave propagation up to heights of the order of 50 km. (Author)

AD-278 539 Div. 9, 25
(TISTP/TL) OTS price $6.60

Bolt, Beranek and Newman, Inc., Cambridge, Mass.
EFFECT OF LOCALIZED ACOUSTIC EXCITATION ON THE STABILITY OF A LAMINAR BOUNDARY LAYER.
Final technical rept. on Research on Aerodynamic Flow Field,
by Francis J. Jackson and Manfred A. Heckl.
June 62, 56p. incl. illus. 21 refs.
(Contract AF 33(616)8001, Proj. 7064)
(ARL 62-362) Unclassified report

DESCRIPTORS: *Laminar boundary layer, *Acoustics, Turbulence, Vibration, Oscillation, Stability, Excitation, Vortices.

Investigations were performed utilizing a localized surface source of acoustic energy to generate disturbances in a laminar boundary layer flow to uncover the influence of induced surface vibrations on the stability of a shear flow boundary layer. Explorations were carried out over a frequency range of from 50 to 10,000 cps, using input sound pressure levels of up to 145 db re 0.0002 dynes/sq cm. Results are presented which indicate the effect of sonic parameters (frequency, amplitude) on both the mean and fluctuating components of the boundary layer flow. Induced boundary layer oscillations are discussed, where appropriate, in terms of the stability theory of Tollmien and Schlichting. Studies of distortion of boundary layer oscillations are described and the role of such distortion in producing transition is discussed. Nonlinear secondary flows (streaming) generated by the localized source are also treated. Exploration of the influence of sonic excitation on premature transition produced both by increasing the free stream turbulence level and by use of a tripping wire is described. (Author)

AD-278 579 Div. 9
(TISTP/WH) OTS price $2.60

Brown U., Providence, R. I.
APPLICATION OF SCHMIDT'S METHOD TO THE CALCULATION OF SPALDING'S FUNCTION AND OF THE SKIN-FRICTION COEFFICIENT IN TURBULENT FLOW.
Interim technical rept. on Research on Aerodynamic Flow Fields,
by J. Kestin and L. N. Persen. Dec 61, 19p. incl. illus. tables, 12 refs.
(Contract AF 33(616)7749, Proj. 7063)
(ARL-169, pt. 2)
Unclassified report

DESCRIPTORS: *Turbulent boundary layer, *Heat transfer, *Numerical methods and procedures, Integration, Functions.

The details of the numerical computation of the so-called Spalding function (ASME 1961, Part II: 39) which occurs in the theory of heat transfer across turbulent boundary layers, are described. The present calculation is confined to the case when the Prandtl number Pr = 1 and when the assumption of a constant turbulent Prandtl number equal to unity can be made. The method used is a modification of E. Schmidt's numerical scheme for the integration of the time-dependent, one-dimensional Fourier equation of heat conduction. In the present case, the term which plays the part of thermal diffusivity depends on the analog of the space-coordinate and renders the equation singular at the origin. The singularity is circumvented by making use of the fact that the temperature profiles must possess zero curvature at the wall. By the use of the Reynolds analogy for turbulent boundary layers it is shown that the preceding calculations can be used to obtain a relation between the skin friction coefficient and the length Reynolds number for a flat plate wetted by a turbulent boundary layer. The integration is very simple and provides a method of judging the accuracy of D. B. Spalding's law of the wall. This turns out to be reasonably satisfactory. (Author)

AD-278 682 Div. 9, 25
(TISTP/WH) OTS price $10.50

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
THE MAGNETOHYDRODYNAMIC FLOW PAST A NONCONDUCTING FLAT PLATE IN THE PRESENCE OF A TRANSVERSE MAGNETIC FIELD.
Doctoral thesis,
by Donald M. Dix. 9 July 62, 128p. incl. illus. tables, 26 refs. (Technical rept. no. 397)
(Contract DA 36-039-sc-78108, Proj. 3-99-00-000)
Unclassified report

DESCRIPTORS: *Magnetohydrodynamics, *Fluid flow, *Fluid mechanics, *Magnetic fields, Sheets, Laminar boundary layer, Turbulent boundary layer.

The general character of the magnetohydrodynamic flow past a nonconducting flat plate in the presence of transverse magnetic fields is analyzed in some detail. The appropriate extension of the Rayleigh problem to the magnetohydrodynamic case is shown to yield solutions that correctly predict some features of the steady flow past a semi-infinite flat plate. Also, it is shown that the knowledge of these significant features permits an easy evaluation of their magnitudes in other extensions of the Rayleigh problem. The flow past a semi-infinite flat plate is analyzed by two methods. First, by linearizing the governing equations and incorporating the assumption of a low ratio of viscous-to-magnetic diffusivity, the results for skin friction and the normal component of magnetic field at the plate are obtained, and are shown to be useful in interpreting the character of these low conductivity flows. Second, the complete set of governing equations is formulated as a finite difference problem and solved numerically on a digital computer. The results obtained show that the disturbance produced by the plate is no longer confined to a thin viscous layer if the ratio of viscous-to-magnetic diffusivity is greater than 0.01 but that an appreciable Alfven type of disturbance is excited. (Author)

AD-278 694 Div. 9, 25
(TISTP/WH) OTS price $2.60

Naval Ordnance Lab., White Oak, Md.
EFFECT OF FREE-STREAM SHEAR ON AN INCOMPRESSIBLE, FLAT-PLATE, MAGNETOHYDRODYNAMIC LAMINAR BOUNDARY LAYER,
by E. L. Harris. 10 Apr 62, 29p. incl. illus. tables, 8 refs. (Aeroballistic research rept. no. 153; NOLTR 61-60)
Unclassified report

AD-278 515 Div. 12, 5, 6
(TISIW/RD) OTS price $3.00

Aeronutronic, Newport Beach, Calif.
STUDY AND EXPERIMENTAL INVESTIGATION ON SAMPLING RATE AND ALIASING IN TIME-DIVISION TELEMETRY SYSTEMS.
Final rept., Mar-Sep 61,
by J. W. Capps, W. F. Link and others. June 62, 1v. incl. illus. 22 refs.
(Contract AF 33(616)8033, Proj. 4107)
(ASD TR 61-553) Unclassified report

DESCRIPTORS: *Telemeter systems, Telemetering data, Sampling, Functions, Statistical analysis, Data, Errors, Triggered gates, Trigger circuits, Multiplex transmission.

A study to determine the effect of (1) data power spectrum and (2) system design parameters on aliasing and data interpolation error was conducted. Results are applicable to time-division multiplexed telemetry systems. In particular, the results apply to the commonly used PAM-FM, PDM-FM and PCM-FM telemetry systems. Data was obtained on the basis of combined analysis and experiment with emphasis on the derivation of experimentally proven design parameters. The program consisted of three phases: (1) A survey was conducted to determine typical telemetry data spectra. (2) Analysis was performed to predict accuracy performance of practical data and interpolation filters using selected examples. Included is a more general analysis to determine optimum filter transfer functions, both realizable and non-realizable. (3) Experimental tests using data spectral models were performed to derive proven interpolation accuracy performance on the basis of practical filters and design parameters. The experimental tests utilized a PAM-FM system to derive an accurate measurement of attainable performance and to indicate when other equipment factors begin to impose a limit on data recovery accuracy. (Author)

AD-278 566 Div. 12, 6
(TISTW/DLW) OTS price $19.75

Hughes Aircraft Co., Culver City, Calif.
RECOGNITION, IDENTIFICATION AND DATA PROCESSING.
Final technical rept.,
comp. by M. J. Anderson. Mar 62, 1v. incl. illus. tables (Rept. no. TM-704)
(Contract AF 19(604)8437, Proj. 4691)
(AFCRL 62-170) Unclassified report

DESCRIPTORS: *Data processing systems, *Satellite vehicles, *Antiaircraft defense systems, *Radio interception, *Photographic analysis, *Infrared detectors, Identification systems, Detection, Aerial targets, Measurement, Infrared radiation, Target recognition, Identification.

Problems associated with the application of new sensor and data processing techniques applicable to the recognition of non-cooperative aerospace vehicles are investigated. An aerospace vehicle recognition system concept is formulated. An evaluation methodology applicable to target recognition systems is developed. The methodology takes into account the principal functions performed by recognition systems, the quality of performance, the time required to perform the functions and the cost of the system. The methodology is applicable to evaluating or optimizing different system configurations and operational procedures. A decision procedure and the appropriate data processor applicable to aerospace vehicle recognition is discussed. Methods for extracting appropriate information from the outputs of representative sensors applicable to aerospace target recognition are investigated. The representative sensors chosen are the ground based R-F signal interceptor and the IR-visual appearance-behavior sensor. (Author)

AD-278 687 Div. 12, 18, 30
(TISTW/DLW) OTS price $2.60

Melpar, Inc., Watertown, Mass.
APPLICATION OF RECOGNITION THEORY TO MISSILE IDENTIFICATION AND DECOY DISCRIMINATION.
VOLUME 2.
Final rept.
12 July 62, 29p. incl. tables.
(Contract AF 30(602)2420, Proj. 4983)
(RADC TDR 62-349, vol. 2)
Unclassified report

DESCRIPTORS: *Guided missiles, *Radar decoys, *Data processing systems, *Re-entry vehicles, *Antiaircraft defense systems, *Guided missile detection, Theory, Guided missile trajectories, Automatic, Classification, Statistical analysis, Vector analysis, Matrix algebra, Probability, Measurement, Computer logic, Target recognition, Identification, Mathematical computer data, Detection.

Theoretical and computational aspects are presented of the classified main problem. Using the previously developed n-dimensional vector space representation of events or patterns, analysis of patterns represented as vectors in this space are formulated. The data upon which the computer programs of these methods were performed were the speech formant data. Although there are many reasons to indicate that the data produced by the spoken words in the final digital form by the Melpar Formant Tracker were not faithful representations of the original signals, the computer results on these data were quite significant and enlightening because of the many different computer programs which were experimented with on the same set of data. (Author)

AD-278 709 Div. 12, 2
(TISTP/JW) OTS price $3.60

RAND Corp., Santa Monica, Calif.
ON THE PERTURBED MOTION OF A LUNAR SATELLITE,
by H. B. Schechter. July 62, 27p. incl. illus. 3 refs. (Research memo. no. RM-3088-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Perturbation theory, *Lunar probes, *Celestial mechanics, Satellite vehicle research, Orbital flight paths, Gravity, Solar atmosphere, Velocity.

Pontecoulant's solution of the three-body problem of the lunar theory is briefly discussed and applied to the motion of a lunar satellite perturbed by the Earth in order to obtain an estimate of the changes caused in the radial coordinate. It was found that the maximum decrease in nominal perilunar radius r sub P depends on the ratio m of the angular velocities of the perturbing body and the satellite, and on an eccentricity parameter e in the combination 2em(1 + e) r sub P. For a satellite with an orbital period approximately 1/15 that of the Moon, and an eccentricity parameter of 0.2, this decrease amounts to about 3 per cent of perilunar radius, which is not an appreciable amount. The additional perturbation caused by the sun was found to be of negligible magnitude. (Author)

AD-278 804 Div. 12, 26, 1
(TISTW/EET) OTS price $1.25

American Inst. for Research, Pittsburgh, Pa.
SOME PROCEDURES IN DESIGN FOR MAINTAINABILITY.

Nitric oxide was found to be slightly soluble in anhydrous HF but its solubility was increased by two orders of magnitude by the addition of N204. (Author)

AD-278 607 Div. 10
(TISTW/DLW) OTS price $1.00

Bureau of Mines, Pittsburgh, Pa.
EVALUATION OF RADIANT HEAT FLUX AND TOXICITY IN DYNA-SOAR-TITAN II DESTRUCT TESTS.
Final rept.,
by Frank C. Gibson, John M. Murphy, and David Burgess. May 62, 28p. incl. illus. tables, 7 refs.
(ASD TDR 62-221) Unclassified report

DESCRIPTORS: *Booster rockets, *Liquid rocket propellants, *Rocket oxidizers, *Fuel tanks, *Explosions, Tests, Measurement, Heat of reaction, Hypervelocity vehicles, Combustion, Toxicity, Model tests, Thermal radiation.

Two destruction tests were conducted of scale models of the Titan II fuel tankage systems. Total quantities of propellant involved were 14,000 pounds for one test, and 32,000 pounds for the other, of the Aerozine -N sub 2 O sub 4 combination used in this booster. The work was restricted to providing information on 3 specific questions: (1) the completeness of reaction on putting together the hypergolic propellant combination; (2) the radiant heat flux from the reaction zone; and (3) the quantity and distribution of toxic vapors. No consideration is given to the overpressure produced by the explosion. It is estimated that reaction was about 20% completed within a period of 5 - 7 seconds. Additional reaction ensued on the test pad and all residual fuel was consumed by burning in air. About half of the oxidant was dispersed unreacted and largely carried upward in the thermal column resulting from the explosion. The peak radiation levels from the explosions were about 10 to the 9th power watts. (Author)

AD-278 732 Div. 10
(TISTM/MS) OTS price $13.00

Thiokol Chemical Corp., Elkton, Md.
A RESEARCH STUDY TO ADVANCE THE STATE-OF-THE-ART OF SOLID PROPELLANT GRAIN DESIGN.
Annual summary rept., 1 Mar 61-1 Mar 62.
4 May 62, 1v. incl. illus. tables, refs. (Rept. no. E70-62)
(Contract AF 33(616)6530, Proj. 3059)
Unclassified report

DESCRIPTORS: *Solid rocket propellants, *Propellant grains, Surfaces, Configuration, Geometry, Porosity, Errors, Reliability, Combustion, Interior ballistics, Stresses, Photoelasticity, Heat transfer, Flame propagation, Mathematical analysis, Statistical analysis, Equations, Programming, Design.

A generalized computer program is being developed for determining the geometric and ballistic properties of internally burning rocket motor grain designs. The program considers head and aft end web effects as well as the straight-through portions of the grain. Strain analysis of solid propellant motors was conducted employing the Photostress technique, under steady state thermal loading. The tangential and radial strains on the end faces of four solid propellant motors are analyzed to determine strain concentration factors and the effect of two different web fractions on strains. The effects of various propellant defects on motor performance were studied. Data obtained from high speed photographic coverage of 5-inch CP windowed test motors is presented. The study includes determination of the minimum propellant thickness to protect circular voids from premature ignition, and the resistance of liner to flame propagation through cracks extending into a liner-propellant interface. Heat transfer analyses were made in which numerical and electrical analog techniques are used to simulate the thermal conditioning history of a motor grain. (Author)

AD-278 802 Div. 10, 14
(TISTM/EJH) OTS price $13.00

Atlantic Research Corp., Alexandria, Va.
A STUDY OF EXTINGUISHMENT AND CONTROL OF FIRES INVOLVING HYDRAZINE-TYPE FUELS WITH AIR AND NITROGEN TETROXIDE.
Final rept., Dec 59-Sep 61,
by M. Markels, Jr., R. Friedman and others.
May 62, 180p. incl. illus. tables, 31 refs.
(Contract AF 33(616)6918, Proj. 6075)
(ASD TR 61-716) Unclassified report

DESCRIPTORS: *Liquid rocket propellants, *Hydrazines, *Methyl hydrazines, *Jet engine fuels, *Rocket oxidizers, *Combustion, Mixtures, Hydrocarbons, Fuels, Tetroxides, Nitrogen compounds, Air, Halides, Hazards, Methanes, Foams, Water, Bicarbonates, Sodium compounds, Chemicals, Alcohols, Fires, Inhibition.

Burning rates, extinguishing agents, and extinguishment mechanisms were determined for open-pan fires of hydrazine, unsymmetrical dimethylhydrazine (UDMH), JP-X. A 50-50 mixture of hydrazine and UDMH oxidized by air and N204 was studied in open pans and in a 1/50 scale model of a Titan II silo. Bicarbonate-based dry chemicals extinguished the pan fires promptly, and with the least weight of agent. Water extinguished the fires by diluting the fuel surface. Course spray and alcohol-type foams were effective forms of water application. After extinguishment by dilution, the fires could not be reignited. Water spray was not effective against JP-X fires because of the separation of a low-density, hydrocarbon-rich layer. Specific rates of application or selected agents under various fire conditions are given. The amine fuels (with the exception of JP-X, which was not tested), exploded hypergollically on contact with liquid N204 tetroxide in about half the tests. (Author)

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

12. GUIDED MISSILES

AD-278 438 Div. 12
(TISTW/RD) OTS price $9.10

Inter-Range Instrumentation Group, White Sands Missile Range, N. Mex.
PROCEEDINGS OF THE THIRD ALL-IRIG SYMPOSIUM.
1960. 123p.
(Document no. 107-60)
Unclassified report

DESCRIPTORS: *Symposia, *Instrumentation, Guided missiles, Optical systems, Meteorological instruments, Geodetic data, Motion picture photography, Test facilities.

DESCRIPTORS: *Adhesives, *Bonding, Metal plastic adhesives, Shear stresses, Tests, Honeycomb cores, Climatic factors, Jet engine fuels, Deterioration, Mechanical properties, Sandwich panels, Metals.

Sandwich panels were fabricated in the laboratory using FMS-0015 (skin-to-core) and FMS-0016 (metal-to-metal) adhesives, glass reinforced plastic honeycomb core, 7075T-6 aluminum slugs and 2024T-86 aluminum skins and evaluated before, after and during a five year exposure period to outdoor weather. The following tests were used to evaluate the effect of exposure: 260 F core shear and shear modulus of rigidity, 260 F edgewise compression, 260 F accelerated column-beam creep, R. T. simple beam, R. T. lap shear strength and 260 F flatwise tension. In addition, standard half inch overlap shear specimens bonded with FMS-0015 and FMS-0016 adhesives and 2024T-3 skins were evaluated by immersion in JP-4 fuel at 140 F and tested at R. T. and 260 F at intervals up through a five year immersion period. Results obtained on the FMS-0015 and FMS-0016 adhesive bonded 4FTW244-3 panels indicate that neither exposure to outdoor weathering nor direct contact with JP-4 fuel results in significant reduction of panel strength up through a five year exposure period. Likewise no deleterious effects were observed when FMS-0015 and FMS-0016 adhesive bonded lap shear specimens were immersed in JP-4 fuel at 140 F up through a five year period. (Author)

AD-278 562 Div. 14
(TISTM/REB) OTS price $2.60

General Plastics Corp., Bloomfield, N. J.
RESEARCH AND DEVELOPMENT OF THIN POLYTETRAFLUOROETHYLENE (TEFLON) COATINGS BY ELECTRODEPOSITION.
Quarterly rept., 19 Mar-19 June 62, by Robert W. Logan. 25 July 62, 23p. incl. tables, 8 refs.
(Contract NOw 62-0600-c)
Unclassified report

DESCRIPTORS: *Plastic coatings, *Steel, *Polymers, *Fluorides, *Ethylenes, *Lubricants, Thin films, Electroplating solutions, Coatings, Electrodeposition, Films.

An investigation was made of electrodeposition methods for applying thin (.0006 - .0010-in.) polytetrafluoroethylene (TFE) coatings to steel substrates. The electrodeposited films are intended to serve as dry lubricant and preservative coatings for a wide variety of U. S. Navy and U. S. Marine Corps equipment. Thin, smooth, crack-free films within the above thickness range have been produced by anode electrodeposition from TFE baths stabilized with perfluorooctanoic acid. However, these coatings are poorly adhered to steel substrates. Additives to this bath, such as small amounts of fluorinated ethylene propylene (FEP) and/or large amounts of chrome oxide green pigment, result in a slight improvement in the adhesion. This increase is accomplished without appreciably lowering the critical cracking thickness (CCT) necessary to produce crack-free films in the required thickness range. The adhesion, however, is still less than that exhibited by sprayed TFE finishes employing a primer and a further increase is required. Other additives to the plating baths, surface modification of the steel substrate by chemical etchants and/or chromium-containing coatings have ot yet proved successful. (Author)

AD-278 572 Div. 14
(TISTM/AW) OTS price $3.60

Narmco Industries, Inc., San Diego, Calif.
POTENTIAL OF FILAMENT WOUND COMPOSITES.
Monthly progress rept. no. 14, 1-30 June 62, by W. H. Otto, S. Dharmarajan, and C. Y. Chia. 30 June 62, 33p. incl. illus. 8 refs.
(Contract NOw 61-0623-c)
Unclassified report

DESCRIPTORS: *Filament wound construction, *Glass textiles, *Epoxy resins, Humidity, Rupture, Stresses, Laminates, Differential equations.

The effect of humidity cycling on the tensile strength of single E-glass fibers coated with epoxy resin are reported for cycling periods up to five days. Experiments to study the effect of fiber tension during resin cure were initiated and stress rupture tests at room temperature are reported. Based on the large deflection theory of a homogeneous plate by Von Karman and the small deflection theory of asymmetrically laminated anisotropic plates by Stavsky and McGarry, a large deflection theory of asymmetrically laminated anisotropic plates was developed. The transverse shearing stresses and the stress normal to the plane of the plate could be computed from the governing differential equations and macroscopic equilibrium equations. To satisfy the loading conditions at the top and bottom surfaces of the plate three linear differential equations were obtained in addition to the eighth order system of nonlinear governing differential equations. (Author)

AD-278 592 Div. 14
(TISTM/AW) OTS price $1.60

Smith, A. O., Corp., Milwaukee, Wis.
GLASS SURFACE CHEMISTRY FOR GLASS FIBER REINFORCED PLASTICS.
Monthly progress rept. no. 4, 1-30 June 62. 15 July 62, 5p. illus. tables, 15 refs.
(Contract NOw 62-0679-c)
Unclassified report

DESCRIPTORS: *Adhesion, *Epoxy resins, Glass textiles, Plastics, Bonding, Tests, Failure (Mechanics), Surfaces.

Wetting studies of chemically cleaned and contaminated types of E glass surfaces with and without A-1100 treatment are reported. The captive bubble technique is described in detail. Bond strength studies with the dry butt-joint tensile test continued to indicate poor reproducibility. A different test technique is being developed. Bond life studies by the flat plate test showed early failure of the degassed type glass surface. The alkali-deficient type surface is still on test after 11 days. The finish-treated contaminated and chemically cleaned glass surfaces are still on test after 36 days. (Author)

AD-278 603 Div. 14, 25
(TISTM/TCG) OTS price $2.00

National Carbon Co., Lawrenceburg, Tenn.
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS. VOLUME VII. HIGH DENSITY RECRYSTALLIZED GRAPHITE BY HOT FORMING.
Final rept. for June 57-June 61 on Refractory Inorganic Non-Metallic Materials, by E. A. Neel, A. A. Kellar, and J. J. Zeitsch. June 62, 63p. incl. illus. tables, 10 refs.
(Contract AF 33(616)6915, Proj. nos. 7350, 7381 and 7-817)
(WADD TR 61-72, vol. 7) Unclassified report

Final rept. on Human Performance in Advanced Systems,
by James W. Altman. Feb 62, 42p. incl. illus. tables, 3 refs.
(Contract AF 33(616)6124, Proj. 7184)
(MRL TDR 62-9) Unclassified report

DESCRIPTORS: *Maintenance, *Weapons, Guided missiles, Test facilities, Test equipment, Launching sites, Ground support equipment, Electrical equipment, Maintenance equipment, Maintenance personnel, Maintenance tools, Specifications, Standardization, Installation, Operation, Identification, Personnel, Human engineering, Costs, Effectiveness, Reliability, Management engineering, Military requirements, Quality control, Air force equipment, Design.

Procedures for including maintenance design considerations in advanced systems analysis and conceptual design are emphasized. Maintenance design procedures applicable to development, production, and operational phases are identified. The types of maintenance design requirements and specifications that should be prepared, the purposes they serve, useful content and organization, background sources, and priorities for different requirements are discussed. A systematic approach to the identification and analysis of required maintenance functions is described. Major steps in functions analysis are the identification of different maintenance areas; separate approaches to the identification of preventive, corrective, recycle, and direct support functions; collation, combination, and organization of maintenance functions; and tradeoff of functions between man and machine. (Author)

13. INSTALLATIONS AND CONSTRUCTION

No Entries

14. MATERIALS (NON-METALLIC)

AD-278 518 Div. 14
(TISTB/MS) OTS price $1.60

Aeronautical Materials Lab., Naval Air Material Center, Philadelphia, Pa.
DEVELOPMENT OF GENERAL PURPOSE HEAT RESISTANT AIRCRAFT FINISHES,
by A. O. Stander. 10 July 62, 11p. incl. tables, 5 refs. (Rept. no. NAMC-AML-1459)
Unclassified report

DESCRIPTORS: *Aircraft finishes, Plastic coatings, Heat resistant paints, Heat resistant polymers, Acrylic resins, Paints, Plastics, Coatings, Specifications, Physical properties.

Data are presented on the heat resistance, adhesion characteristics, and diester fluid resistance properties of various aircraft coating systems (acrylics and epoxies). The use of Specification MIL-C-5541 chemical film as a prepainting surface treatment for 17-7 stainless steel and Inconel is discussed. (Author)

AD-278 547 Div. 14
(TISTA/GEC) OTS price $15.50

Southwest Research Inst., San Antonio, Tex.
LUBRICATION RESEARCH AND TEST METHOD DEVELOPMENT FOR AEROSPACE PROPULSION SYSTEMS.
Rept. for 15 Mar 60-14 Jan 61 on Aviation Lubricants,
by B. B. Baber, P. M. Ku and others. May 61, 225p. incl. illus. tables, 80 refs.
(Contract AF 33(616)7223, Proj. 3044)
(ASD TR 61-85) Unclassified report

DESCRIPTORS: *Lubricants, *Oils, *Lubrication, Gears, Bearings, Liquefied gases, Oxygen, Oxidation, Impact shock, Sensitivity, Deterioration, Fatigue (Mechanics), Statistical analysis, Test methods, Test equipment, Rocket propulsion, Tests.

A study was made of lubrication problems associated with advanced primary and secondary propulsion systems for aviation and space applications. The four principal phases of investigation were: gear lubrication, bearing lubrication, lubricant oxidation, and impact sensitivity of materials in contact with strong oxidizers. In the gear lubrication and the bearing lubrication phases, the emphasis was on the development of suitable test methods for determining the capabilities of liquid lubricants intended for use in high-temperature applications. Lubricant oxidation determinations were made on organic liquid lubricants. The impact sensitivity work was concerned with the impact sensitivity of liquid lubricants, greases and sealants in contact with liquid O and with test method development in an endeavor to improve the repeatability and reproducibility of the impact test. (Author)

AD-278 558 Div. 14
(TISTM/MS) OTS price $5.60

General Dynamics/Fort Worth, Tex.
MATERIAL - ADHESIVE - METAL TO METAL - FMS-0015 AND FMS-0016 - SYNTHETIC OILS AND WEATHERING - EFFECTS OF,
by J. E. Thomas. 20 Oct 61, 47p. incl. illus. tables (Rept. no. FGT-2853)
(Contracts AF 33(600)36200 and AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Adhesives, *Bonding, *Metal plastic adhesives, Shear stresses, Tests, Climatic factors, Oils, Deterioration, Mechanical properties, Sandwich panels, Metals.

Sandwich panels, laboratory and production bonded with FMS-0015 and FMS-0016 adhesives, were tested before, after, and during five years exposure to outdoor weather. The following tests were conducted to evaluate the effects of exposure: 260 F column compression (''iron maiden''), 260 F core shear and modulus of rigidity, 260 F edgewise column compression, 77 F simple beam, 260 F column creep, and 77 F lap shear strength. (Author)

AD-278 559 Div. 14
(TISTM/MS) OTS price $5.60

General Dynamics/Fort Worth, Tex.
MATERIAL - ADHESIVES - FMS-0015 (SHELL 422J OR HEXCEL HP-422) AND FMS-0016 (PLASTILOCK 620-626) JP-4 FUEL IN SANDWICH PANELS - EFFECTS OF,
by J. E. Thomas. 27 Feb 62, 51p. incl. illus. tables (Rept. no. FGT-2855)
(Contracts AF 33(600)36200 and AF 33(675)7248)
Unclassified report

Alumina whiskers were grown at 1700 to 1800 C in argon and helium atmospheres containing small amounts of hydrogen. Whiskers thus produced were analyzed by X-ray diffraction, by spectrographic emission, and by wet chemical methods. For the chemical analysis a scheme was developed for establishing impurity levels in the whiskers. Also, a simple tube furnace apparatus for whisker growth is described. Conditions conductive to growth were investigated, as well as characteristics of whisker growths. Some whiskers which possess unusually complex dendritic growth patterns were examined in considerable detail, and evidence was found of several distinct types of growth forms. (Author)

Division 14 - MATERIALS (NON-METALLIC)

DESCRIPTORS: *Graphite, *Creep, Carbon black, Physical properties, Mechanical properties, Electrical properties, Crystal structure, Density, Porosity, Tensile strength, Fracture (Mechanics), Temperature, Thermal stresses, Heat treatment, Thermal expansion, Thermal conductivity, Resistance, Electron microscopes, X-ray diffraction analysis, Grains (Metallurgy), Production, Rocket motor nozzles, Tests.

This report describes the mechanical and thermal properties of several types of ZT graphite. Grade ZTA is discussed in detail and its physical properties are compared to those of other premium graphites, including pyrolytic, over the range from room temperature to 3000 C. Specifications for Grade ZTA are established. The properties of other grades of ZT graphite and the results from 70 subscale firings in solid fuel rocket motors at various locations are tabulated. (Author)

AD-278 667 Div. 14, 26, 12
(TISTM/TCG) OTS price $4.60

Goodyear Aircraft Corp., Akron, Ohio.
STRUCTURAL FABRIC PROGRAM.
Quarterly interim technical progress rept. no. 4, 1 Apr-30 June 62,
by E. Bilsky and J. O. Miller. June 62, 38p. incl. illus. tables.
(Contract AF 33(600)43036)
(ASD TR 7-904, vol. 4) Unclassified report

DESCRIPTORS: *Textiles, *Metallic textiles, *Synthetic fibers, Structures, Materials, Industrial equipment, Machines, Design, Specifications, Wire, Processing, Manufacturing methods, Packaging, Gliders, Re-entry vehicles, Density.

Research continued toward the development of a means of manufacturing large low-density Airmat structures made of metallic cloth and yarns capable of small volume packaging. The basic design of the loom was established and the loom specification was completed. The major portion of the work was devoted to the pile yarn extension and contouring mechanism. In addition, investigations were made of wire weaving techniques used by outside manufacturers. These efforts are directed toward the development of a loom procurement specification and the actual procurement of a loom capable of producing a low-density Airmat in the order of 20 ft wide with a maximum depth of 8 ft. (Author)

AD-278 671 Div. 14, 25
(TISTM/TCG) OTS price $1.60

Arizona State U., Tempe.
OXIDE SEMICONDUCTOR MATERIALS AND DEVICE RESEARCH.
Quarterly progress rept. no. 2, 18 Feb-17 May 62, on Research to Investigate Electrical and Thermal Properties of Oxide Semiconductor Materials,
by F. English, B. Gossick and others. 17 May 62, 16p. incl. illus. table, 6 refs.
(Contract DA 36-039-sc-89151)
Unclassified report

DESCRIPTORS: *Semiconductors, *Oxides, Metallic compounds, Transition elements, Diodes, Titanium compounds, Dioxides, Ceramic materials, Preparation, Resistance, Thermoelectricity, Photoelectric effect, X-ray diffraction analysis, Materials, Electrical properties.

The uniformity of the surface of individual rectifying diodes made from ceramic rutile was investigated by measuring the forward resistance and the reverse breakdown voltage at different points on a single sample. Significant variations were found. Materials used for plastic encapsulation are described. The use of NH_3 and H_2S for the reduction of ceramic rutile to form a semiconducting material produced results comparable to those obtained with a mixture of H_2 and He. X-ray diffraction patterns of strongly reduced ceramic rutile were made. Only two crystalline phases, corresponding to TiO_2 (rutile) and Ti_4O_7, were observed in the resulting composition which had a stoichiometric composition of $TiO_{1.76}$. Preliminary experiments on diodes made from ceramic rutile exhibited photo-excitation effects when the rectifying barrier is subjected to high intensity light pulses. The effect is measurable and will be subjected to analysis as more data is gained. (Author)

AD-278 727 Div. 14, 17
(TISTM/MS) OTS price $2.60

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
DESIGN DATA STUDY FOR COATED COLUMBIUM ALLOYS.
Bimonthly technical progress rept. no. 3, 21 Apr-21 June 62,
by J. D. Gadd. 21 July 62, 26p. incl. illus. tables, 24 refs. (Rept. no. TM-3470-67)
(Contract NOw 62-0098-c)
Unclassified report

DESCRIPTORS: *Coatings, *Refractory coatings, *Oxidation inhibitors, *Silicon coatings, *Niobium alloys, Zirconium alloys, Sheets, Silicides, Aluminum, Alloys, Oxidation, Plasticity, Elasticity, Refractory materials, Reentry vehicles, Deformation, Vacuum apparatus, Vapor plating, High temperature research, Design.

Final evaluation of the screening tests on seven oxidation protective coatings applied to D-14 alloy has been completed. Coatings applied by Pfaudler, TRW and Vought have been tentatively selected for evaluation in the design data study, and the GT&E coating was selected as an alternate. Fansteel 85 alloy will be the base material for the design data study. A brief evaluation of the three candidate coatings applied to FS-85 alloy was performed, involving room temperature bend tests, cyclic oxidation tests at 2000 and 2600 F, and room temperature prestrain followed by cyclic oxidation at 2000 and 2600 F. Specimen preparation is in progress for the design data study and a description is presented of the specimen design and testing equipment for this phase of the program. (Author)

AD-278 806 Div. 14
(TISTM/AW) OTS price $1.00

Directorate of Materials and Processes, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
GROWTH AND ANALYSIS OF ALUMINA ''WHISKERS.''
Final rept., Aug 60-Sep 61 on Refractory Inorganic Nonmetallic Materials,
by C. T. Lynch, F. W. Vahldiek, and L. B. Robinson. May 62, 34p. incl. illus. tables, 18 refs.
(Proj. 7350)
(ASD TDR 62-272) Unclassified report

DESCRIPTORS: *Aluminum compounds, *Single crystals, Refractory materials, Argon, Helium, Hydrogen, X-ray diffraction analysis, Spectrographic analysis, Chemical analysis, Laboratory furnaces, Oxides, Growth.

DESCRIPTORS: *Quantum mechanics, *Atomic orbitals, *Matrix algebra, Electrons, Density, Atomic energy levels.

The condition that must be satisfied by a Hartree-Fock wave function if it is to give an absolute minimum of the energy, is derived by variation of the one-electron density matrix. If the energy is not an absolute minimum, the state is unstable. Introducing spin explicitly into the equations, there are two classes of variational functions which are particularly suitable in investigations of stability. The one variation is related to the alternate orbital transformation, while the other is connected with Hund's rule and the conditions for ferromagnetism. The first of these variations is used in two numerical examples. In the first example the stability of a restricted Hartree-Fock wave function for LiH relative to an unstricted one is investigated. For the chosen basis set, the restricted Hartree-Fock wave function is stable at the equilibrium internuclear distance (3.0 au), but that at 4.0 au it becomes unstable. The second example investigates the relative stability of the restricted and unrestricted Hartree-Fock approximations for the electron gas. It is shown that at a sufficiently low density, the unrestricted Hartree-Fock method gives a lower energy. The resulting state has a nonzero spin density. The importance of the stability condition in atomic, molecular and solid state problems is emphasized. (Author)

AD-278 514 Div. 15
(TISTP/GRW) OTS price $1.60

Northwestern Technological Inst., Evanston, Ill.
A LEAST-SQUARE METHOD FOR COMPUTING THE GENERALIZED-INVERSE OF AN ARBITRARY COMPLEX MATRIX,
by A. Ben-Israel and S. J. Wersan. June 62, 12p. incl. illus. 17 refs. (ONR research memo. no. 61)
(Contract Nonr-122810, Proj. NR 047-021)
Unclassified report

DESCRIPTORS: *Least squares method, *Matrix algebra, Linear systems.

AD-278 553 Div. 15
(TISTP/JW) OTS price $5.60

Michigan U. Coll. of Literature, Science, and the Arts, Ann Arbor.
A COMBINATORIAL METHOD FOR PRODUCTS OF TWO MULTIPLE $\mathcal{L}$-STATISTICS WITH SOME GENERAL FORMULAE,
by P. S. Dwyer and D. S. Tracy. June 62, 54p. incl. tables, 17 refs. (Rept. no. 04597-1-T)
(Contract Nonr-122441, Proj. NR 042-227)
Unclassified report

DESCRIPTORS: *Statistical processes, *Combinatorial analysis, Transformations (Mathematics), Multiple operations, Algebra.

AD-278 583 Div. 15
(TISTP/GRW) OTS price $2.60

RAND Corp., Santa Monica, Calif.
THE BOUNDARY VALUE PROBLEM ON AN INFINITE INTERVAL. EXISTENCE, UNIQUENESS AND ASYMPTOTIC BEHAVIOR OF BOUNDED SOLUTIONS TO A CLASS OF NONLINEAR SECOND ORDER DIFFERENTIAL EQUATIONS,
by O. A. Gross. Aug 62, 17p. 2 refs. (Research memo. no. RM-3210-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Non-linear differential equations, Particles, Ionization potentials, Algebra.

A class of second-order nonlinear differential equations is studied. It is shown that, for a given member of the class and a given initial value, there exists a unique continuous bounded function on the nonnegative reals which satisfies the equation and the boundary value, and moreover that this function tends to a nonpositive constant as the argument tends to infinity. An application is given to the asymptotic behavior of the bounded solution to the equation governing the motion of a particle in an ionized field under the influence of the Ukawa potential. Since topological methods seem inapplicable in the determination of isolated elements of noncompact spaces, a lattice theory is used. The key tool is a fixed-point theorem. (Author)

AD-278 591 Div. 15
(TISTP/WH) OTS price $1.60

Applied Mathematics and Statistics Labs., Stanford U., Calif.
DISTRIBUTION OF THE TWO-SAMPLE CRAMER-VON MISES CRITERION FOR SMALL EQUAL SAMPLES,
by E. J. Burr. 28 June 62, 13p. incl. tables, 3 refs. (Technical rept. no. 45)
(Contract Nonr-22521, Proj. NR 042-993)
Unclassified report

DESCRIPTORS: *Statistical distributions, *Probability, *Series, *Groups (Mathematics).

Identifiers: Cramer-Von Mises Criterion.

AD-278 648 Div. 15
(TISTP/WH) OTS price $4.60

Columbia U., New York.
DETERMINATION OF THE ORDER OF DEPENDENCE IN NORMALLY DISTRIBUTED TIME SERIES,
by T. W. Anderson. 19 June 62, 42p. incl. 8 refs. (Rept. no. CU-63-62)
(Contract Nonr-26633, Proj. NR 042-034)
Unclassified report

DESCRIPTORS: *Statistical distributions, *Probability, *Series.

AD-278 649 Div. 15
(TISTP/WH) OTS price $2.60

Columbia U., New York.
TIME SERIES ANALYSIS,
by T. W. Anderson. 11 June 62, 24p. incl. 4 refs. (Rept. no. CU-62-62)
(Contract Nonr-26633, Proj. NR 042-034)
Unclassified report

DESCRIPTORS: *Statistical distributions, *Probability, *Series.

AD-278 654 Div. 15
(TISTM/MS) OTS price $1.50

Defense Metals Information Center, Columbus, Ohio.
THE EFFECT OF MOLTEN ALKALI METALS ON CONTAINMENT METALS AND ALLOYS AT HIGH TEMPERATURES,
by M. F. Amateau. 28 May 62, 54p. incl. illus. tables, 51 refs. (DMIC rept. no. 169)
(Contract AF 33(616)9747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: *Liquid metals, *Containers, *Corrosion-resistant alloys, *Refractory materials, *Metals, *Alloys, Nickel alloys, Cobalt alloys, Stainless steel, Alkali metals, Corrosion, High temperature research.

Corrosion of containment materials is the most serious problem in liquid-metal systems. Most

15. MATHEMATICS

AD-278 433 Div. 15
(TISTP/JW) OTS price $1.60

Stanford U., Calif.
DIVERGENCE CONDITIONS AND THE GRAVITATIONAL FIELD EQUATIONS,
by Heinz R. Pagels. June 62, 15p. 2 refs.
(Technical note no. 62)
(Contract AF 49(638)388, Proj. 9750-37500)
(AFOSR-2944) Unclassified report

DESCRIPTORS: *Tensor analysis, *Partial differential equations, Analysis of variance, Gravity, Stresses.

It is shown that in addition to the four divergence laws $T^{\alpha\beta}{}_{|\beta} = 0$, stress tensors satisfying the Einstein field equation must also satisfy the six additional divergence conditions $(T^{\gamma\alpha|\beta} - T^{\gamma\beta|\alpha})_{|\gamma} = 0$. Conversely under quite general assumptions these ten conditions on $T_{\alpha\beta}$ dictate the metric-matter connection proposed by Einstein. In the spirit of Rainich theory the entire content of the gravitational field equations is expressed in terms of conditions on the stress tensor. (Author)

AD-278 460 Div. 15
(TISTP/TL) OTS price $1.60

Operations Research Center, U. of Calif., Berkeley.
ON CONE FUNCTIONS,
by E. Eisenberg. 4 June 62, 11p. incl. 4 refs.
(Research rept. no. 21; IER 172-24)
(Contract Nonr-22283)
Unclassified report

DESCRIPTORS: *Operations research, *Convex sets, *Topology, *Functional analysis, *Inequalities, Vector analysis, Algebra, Sequences, Partial differential equations.

AD-278 488 Div. 15
(TISTP/GRW) OTS price $3.60

RAND Corp., Santa Monica, Calif.
INFERENCE OF MONTE CARLO PROPERTIES FROM THE SOLUTION OF A KNOWN PROBLEM,
by J. I. Marcum. June 62, 31p. incl. illus. tables, 3 refs. (Research memo. no. RM-3184-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Numerical methods and procedures, *Statistical functions, Sampling, Tables.

A machine code was set up which was used to obtain 10,000 runs of 10 samples each from a distribution function that is a reasonable approximation to sampling distributions found in several Monte Carlo transport codes. Histograms of the probability density function for the mean value, of the standard deviation of the mean and of Student's ratio of 10 samples were obtained. Because the standard deviation has an infinite expected value, it is of doubtful usefulness in measuring the probable error of, or placing confidence limits on, the mean value of the sample. Results show that with proper precautions the sample standard deviation may be used to establish confidence limits on the sample mean in spite of the fact that it has an infinite expected value. (Author)

AD-278 490 Div. 15, 9
(TISTP/JW) OTS price $1.60

RAND Corp., Santa Monica, Calif.
TWO CONVOLUTION TRANSFORMS WHICH ARE INVERTED BY CONVOLUTIONS,
by D. V. Widder. July 62, 11p. 4 refs.
(Research memo. no. RM-3234-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Integral equations, *Polynomials, Aerodynamic data, Transformations (Mathematics), Functions, Velocity.

Mathematical research concerning the inversion of a convolution transform in which the kernel is a Legendre polynomial is presented. Classes of integral equations of the sort studied here arise in the determination of solutions of certain velocity-potential problems in aerodynamics. (Author)

AD-278 501 Div. 15, 30
(TISTP/GRW) OTS price $3.60

Uppsala U. (Sweden).
SUCCESSIVE PARTITIONING TECHNIQUE FOR SOLUTION OF SECULAR EQUATIONS,
by Jan Olof Nordling. 1 Dec 61, 32p. incl. illus.
(Technical note no. 69)
(Contract AF 61(052)351)
(ARL-252) Unclassified report

DESCRIPTORS: *Equations, *Matrix algebra, Computers.

A method is presented for determination of the eigenvalues and eigenvectors of real, symmetrical matrices. The treatment is extensively built on matrix-concepts. It may be that the notations are sometimes too detailed, but attempts have been made to maintain a close connection between the theoretical treatment and the preparation of flow-charts and machine programs for electronic computers. (Author)

AD-278 502 Div. 15
(TISTP/GRW) OTS price $2.60

Uppsala U. (Sweden).
A HARTREE-FOCK PERTURBATION METHOD,
by William H. Adams. 1 Dec 61, 21p. 12 refs.
(Technical note no. 70)
(Contract AF 61(052)351)
(ARL-253) Unclassified report

DESCRIPTORS: *Perturbation theory, *Matrix algebra, *Quantum mechanics, Numerical analysis, Electrons, Density, Atomic orbitals.

A perturbation method for the one-electron density matrix in the matrix formulation of the Hartree-Fock approximation, is developed. Application of the method requires no knowledge of the eigenvalues and eigenvectors of the unoccupied orbitals. It is applicable to closed shell systems in the restricted Hartree-Fock approximation, and to any system in the unrestricted Hartree-Fock approximation. (Author)

AD-278 504 Div. 15
(TISTP/GRW) OTS price $2.60

Uppsala U. (Sweden).
THE STABILITY OF HARTREE-FOCK STATES,
by William H. Adams. 15 Dec 61, 27p. incl. illus. 36 refs. (Technical note no. 72)
(Contract AF 61(052)351)
(ARL-255) Unclassified report

AD-278 706 Div. 15
(TISTP/JW) OTS price $8.10

Pennsylvania State U., University Park.
KINEMATICS OF COSSERAT CONTINUA,
by S. C. Cowin and Walter Jaunzemis. May 62, 83p. incl. illus. 20 refs. (Technical rept. no. 5)
(Grant AF-AFOSR-62-115)
Unclassified report

DESCRIPTORS: *Tensor analysis, *Motion, Deformation, Continuum mechanics, Geometry.

This report summarizes and extends the main results in kinematics of oriented media. A review of kinematics of ordinary continua is included, and a study of multiple-space tensors and time-rates of tensors is presented in some detail. (Author)

AD-278 739 Div. 15
(TISTP/JW) OTS price $4.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE ROLE OF CONSTRAINTS IN THE THEORY OF LEAST SQUARES,
by M. Zelen. May 62, 45p. 14 refs. (MRC Technical summary rept. no. 314)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Linear systems, *Least squares method, Matrix algebra, Sampling.

A unified account is presented of the theory of least squares and in particular describes the necessary modifications when linear restraints are imposed on the parameters. The development has been greatly influenced by the use of a 'generalized inverse' of a matrix which in turn leads to interesting new proofs of standard results and to some new results. The treatment distinguishes between restraints imposed for the purpose of obtaining unique solutions and real restraints. In the latter category, it is necessary to take into account whether the real restraints are estimable or non-estimable functions. Applications of the general theory are made to the case of equi-correlated variables (correlation unknown), the general case of a singular variance-covariance matrix among the observations, and to the case where linear restraints are subject to random error. (Author)

AD-278 740 Div. 15
(TISTP/JW) OTS price $4.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE WHITTAKER-HILL EQUATION AND THE WAVE EQUATION IN PARABOLOIDAL COORDINATES,
by F. M. Arscott. May 62, 39p. 12 refs.
(MRC Technical summary rept. no. 319)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Special functions, *Harmonic analysis, *Differential equations, Transformations (Mathematics), Boundary layer, Parabolic bodies, Surfaces.

The problem is that of obtaining solutions of a wave equation suitable for use in connection with paraboloidal coordinates; for example, when boundary conditions are given on a paraboloidal surface. In these coordinates the wave equation is separable, and each of the separated equations is reducible to Hill's equation with three terms. The properties of solutions of this equation are developed sufficiently to make possible the formal solution of simple boundary-value problems for paraboloidal surfaces. A brief consideration is made of the case in which special difficulties occur. (Author)

AD-278 741 Div. 15
(TISTP/JW) OTS price $3.60

Mathematics Research Center, U. of Wisconsin, Madison.
SOME EXTREMAL QUESTIONS FOR SIMPLICIAL COMPLEXES. III. PROBLEMS OF THE GEOMETRY AND ANALYSIS OF THE HIGHER EUCLIDEAN SPACES,
by L. C. Young. May 62, 31p. 15 refs. (MRC Technical summary rept. no. 320)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Algebraic geometry, Geometry.

AD-278 742 Div. 15
(TISTP/JW) OTS price $2.60

Mathematics Research Center, U. of Wisconsin, Madison.
SOME EXTREMAL QUESTIONS FOR SIMPLICIAL COMPLEXES. IV. THE ALGEBRAIC AND THE GEOMETRIC RESULTANT, AN APPLICATION OF VARIATIONAL METHODS,
by W. H. Fleming and L. C. Young. May 62, 19p. 14 refs. (MRC Technical summary rept. no. 322)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Algebraic geometry, Integrals.

AD-278 743 Div. 15
(TISTP/JW) OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
NOTE ON DIFFERENCE APPROXIMATIONS WITH NON-NEGATIVE COEFFICIENTS FOR PARTIAL DIFFERENTIAL EQUATIONS,
by Donald Greenspan. May 62, 16p. 3 refs.
(MRC Technical summary rept. no. 323)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Partial differential equations, Numerical analysis.

Identifiers: Difference approximations.

On region R, the linear operator $\mathcal{L}[u(x,y)] \equiv u_{xx}+2b(x,y)u_{xy}+c(x,y)u_{yy}$, $c(x,y) > 0$, is considered. Conditions are sought under which at $(\bar{x},\bar{y}) \in R$, $\mathcal{L}$ has a difference approximation $L_h[u] \equiv \sum_{i=0}^{8} \alpha_i u_i$ with non-negative coefficients. If b and c are continuous and $u \in C^2(R)$; or, essentially, if b and c are analytic and u is a solution of $\mathcal{L}[u] = 0$, then it is proved that a necessary and sufficient condition for L_h to exist is that $|b(\bar{x},\bar{y})| \leq \min[1, c(\bar{x},\bar{y})]$. When the latter inequality is valid, L_h is given constructively. Application is made to an extension of a numerical method of Bers for mildly nonlinear elliptic differential equations. (Author)

high-temperature engineering metals such as refractory metals, nickel-base and cobalt-base superalloys, and the austenitic and ferritic stainless steels are sufficiently resistant to liquid sodium and NaK to be useful up to about 1600 F. The most important factor in the corrosion of these materials under given conditions of temperature and flow rate is the oxygen content of the sodium. No material is truly corrosion resistant to lithium, although the refractory metals tantalum, columbium, and molybdenum do have some potential for high-temperature service in engineering applications. Zirconium and pure iron may also find some limited use in lithium, especially in lower temperature, two-component, static systems. The cobalt- and nickel-base alloys are unsuitable for high-temperature service in liquid lithium. The nitrogen content of the lithium is a particularly important factor. Potassium, rubidium, and cesium are somewhat less corrosive than the other alkali metals. The refractory metals and alloys are little affected by these liquid metals. The sliding and bearing properties of metals are generally affected adversely by the presence of pure molten metals. (Author)

AD-278 664 Div. 15, 18
(TISTB/AW) OTS price $1.60

George Washington U., Washington, D. C.
SELECTED REFERENCES IN UTILITY THEORY AND MILITARY ESSENTIALITY,
by Jerome Bracken. 20 July 62, 13p. (Serial no. T-138/62)
(Contract Nonr-76105, Proj. 047 001)
Unclassified report

DESCRIPTORS: *Games theory, *Military operations, *Bibliography, *Decision making, Logistics, Probability, Psychometrics, Economics, Statistical analysis, Theory.

This bibliography provides selected background material for the study of military essentiality measures. The first section contains references selected from the academically well-developed area of utility theory. Most of the references include (1) linear expected utility based on assumptions similar to those of von Neumann and Morgenstern, (2) group utilities, (3) experimental work, or (4) survey and interpretation of previous research. The second section contains references in the area of military essentiality. Theoretical and empirical research is included dealing with (1) the derivation of military worth measures, (2) application of the measures in decision problems, or (3) general military decision problems which may profitably use military essentiality measurements. (Author)

AD-278 689 Div. 15, 30
(TISTP/WH) OTS price $6.60

Melpar, Inc., Watertown, Mass.
CLASSIFICATION BY STATISTICAL METHODS (PATTERN RECOGNITION),
by P. W. Cooper. Apr 61, 53p. incl. illus.
(Technical note no. 61-2)
Unclassified report

DESCRIPTORS: *Pattern recognition, *Classification, *Statistical analysis.

Mathematical methods of pattern recognition which make use of the theory of statistical inference are treated. Decision theoretic methods of classification, and learning through parameter estimation form the foundation for this discussion. Although the procedures are formulated in terms of a general functional representation of the distributions, specific solutions are outlined for multivariate Normal distributions. This is followed with a brief commentary on the potential contribution from the field of nonparametric statistics. The analysis concludes with a list of potential applications. (Author)

AD-278 691 Div. 15
(TISTP/JW) OTS price $5.60

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
SOME PROBLEMS IN NONLINEAR THEORY,
by Martin Schetzen. 6 July 62, 53p. incl. illus. 18 refs. (Technical rept. no. 390)
(Contract DA 36-039-sc-78108, Proj. 3-99-00-000)
Unclassified report

DESCRIPTORS: *Nonlinear systems, *Oscillators, Functional analysis, Nonlinear differential equations, Errors, Antennas, Statistical processes.

The first problem considered is the extension of the Wiener theory of nonlinear systems to include non-Gaussian inputs and error criteria other than the mean-square-error criterion. The second problem is the development of a procedure for the experimental determination of higher-order correlation functions without the use of delay lines. An application of this procedure is made to the synthesis of Nth-order Gaussian processes. These processes have the property that their first N joint moments are those of a Gaussian process. The third problem is that of nonlinearly coupled oscillators. For this problem, a statistical model is proposed for a class of oscillators that are non phase-locked. Calculations based on this model demonstrate the effect of second-order nonlinearities upon the spectrum of the coupled oscillators. The fourth problem is that of locating noise sources in space by crosscorrelation techniques. For this problem, expressions are derived for the ambiguity in locating a target as a function of the time of observation when using this crosscorrelation technique with a given configuration of N antennas. (Author)

AD-278 695 Div. 15
(TISTP/WH) OTS price $1.60

North Carolina State Coll., Raleigh.
RESONANT OSCILLATIONS OF AN EXTENSIBLE PENDULUM,
by J. H. Heinbockel and Raimond A. Struble.
July 62, 11p. incl. illus. 3 refs. (Technical memo. no. 3)
(Grant DA-ARO(D)-31-124-G81 PSR 14)
(AROD rept. no. 2125:24) Unclassified report

DESCRIPTORS: *Resonance, *Oscillation, *Harmonic analysis, Non-linear differential equations.

The resonance phenomena and energy transfer associated with a pair of coupled nonlinear differential equations are analyzed using asymptotic methods. These equations describe the motion of an extensible pendulum which exhibits autoparametric excitation. Precise conditions under which resonant or nonresonant oscillations arise are obtained. These conditions not only depend upon the physical parameters of the system but also upon the energy of the oscillations (i.e., initial conditions). In general, the envelopes of the resonant oscillations are periodic with long periods and there is intermittent energy transfer between the two degrees of freedom. (Author)

AD-278 529 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
DETERMINATION OF THE CRITICAL AMBIENT TEMPERATURE FOR MICE TREATED WITH CHLORPROMAZINE,
by Stanley Marcus, Fred Miya and others. Oct 61, 8p. incl. illus. table, 6 refs. (Technical rept. no. 61-35)
(Proj. 8341-32; In cooperation with Utah U. Coll. of Medicine, Salt Lake City)
Unclassified report

DESCRIPTORS: *Body temperature, *Chlorpromazine, Hypothermia, Hyperthermia, Radiation effects, Humidity, Air, Temperature, Laboratory animals, Measurement.

Chlorpromazine can have a hypothermic or hyperthermic effect on the body temperature response of mice, depending upon the ambient temperature. The critical ambient temperature has been calculated to be approximately 33 C using two milligrams per kilogram of chlorpromazine in mice. The ambient temperature is an important factor that can bias the effect of drugs that influence body temperature and should be weighed accordingly when data are analyzed. The influence of other factors such as radiation, relative humidity and air motion has been discussed. (Author)

AD-278 530 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
EFFECT OF AMBIENT TEMPERATURE AND CHLORPROMAZINE TREATMENT ON RESISTANCE OF MICE CHALLENGED WITH KLEBSIELLA PNEUMONIAE,
by Stanley Marcus, Fred Miya and others. Oct 61, 9p. incl. illus. 8 refs. (Technical rept. no. 61-36)
(Proj. 8241-32; In cooperation with Utah U. Coll. of Medicine, Salt Lake City)
Unclassified report

DESCRIPTORS: *Laboratory animals, *Infections, *Klebsiella pneumoniae, Chlorpromazine, Therapy, Toxicity, Body temperature, Hypothermia, Metabolism, Measurement, Temperature, Resistance.

The hypothesis that increased metabolic rates enhance the host resistance to infection was investigated. Chlorpromazine was used to induce the state of hypothermic stress without compensatory increase in metabolic rates. The results of the experiments showed that the ambient environment influences the toxicity of the drug itself. Chlorpromazine enhanced the death of mice challenged with Klebsiella pneumoniae, and an interpretation could be that the lowering of metabolic rates as a result of the drug injection was contributory to this effect. (Author)

AD-278 531 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
EFFECT OF ACUTE AND CHRONIC EXPOSURE TO LOW TEMPERATURES ON SURVIVAL OF MICE CHALLENGED WITH KLEBSIELLA PNEUMONIAE,
by Stanley Marcus, Fred Miya and others. Oct 62, 8p. incl. illus. tables, 8 refs. (Technical rept. no. 61-37)
(Proj. 8241-32; In cooperation with Utah U. Coll. of Medicine, Salt Lake City)
Unclassified report

DESCRIPTORS: *Exposure, *Survival, *Immunization, Laboratory animals, Stress (Physiology), Infections, Antibodies, Klebsiella pneumonia.

Normal and immunized mice were subjected to acute and chronic stress of 2 C ambient temperature. Singly caged mice were adversely affected by the acute cold stress, but mice chronically cold-stressed were significantly protected by the immunization whether caged in groups or singly. Chronic cold stress did not decrease the ability of the animals to form agglutinin antibody. (Author)

AD-278 541 Div. 16, 4
(TISTB/CCH) OTS price $5.60

Battelle Memorial Inst., Columbus, Ohio.
RELATIONS OF ODOR TO PHYSICOCHEMICAL PROPERTIES OF COMPOUNDS.
Rept. no. 8 (Final), 5 Dec 59-31 Dec 61, by Howard G. Schutz, Robert B. Iden and others. 27 Feb 62, 58p. incl. illus. tables, 16 refs. (Rept. no. P-1115-8)
(Contract DA 19-129-qm-1500, Proj. 7-84-15-007)
Unclassified report

DESCRIPTORS: *Odors, *Olfactory thresholds, Classification, Physical properties, Sensory perception, Cholinesterase, Factor analysis, Enzymes, Adsorption, Chromatographic analysis, Measurement, Factor analysis, Correlation techniques.

Work is reported on the following topics: (1) Rank-order intercorrelation matrix was computed for 18 physicochemical and 12 subjective odor parameters over 30 odorants. (2) A multiple-group factor analysis was conducted and five factors extracted. (3) Multiple-regression analyses were conducted for 8 subjective odor parameters using selected physicochemical properties. (4) Experiments were conducted with gas chromatographic columns analogous to olfactory processes. (5) The completion of studies in which the modification of an in vitro acetylcholinesterase system by 36 selected odorants was obtained at three molarities. (6) Determination of the correlation (rho) between each of three subjective odor parameters, absolute threshold, suprathreshold intensity and rate of adaptation, and the values obtained in (5) for odorants on which both chemical and subjective data were available. Significant relations were found for rate of adaptation and enzyme effects which held true for all three molarities. (7) A summary of investigations on instrumentation for a suprathreshold, threshold intensity comparison study. (Author)

AD-278 625 Div. 16, 25, 1
(TISTB/CCH) OTS price $2.75

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
NOISE FROM AIRCRAFT OPERATIONS.
Final rept. on Human Response to Vibratory Energy,
by Welden E. Clark. Nov 61, 124p. incl. illus. table, 48 refs.
(Contract AF 33(616)5629, Proj. 7210)
(ASD TR 61-611) Unclassified report

DESCRIPTORS: *Noise, *Aircraft, *Air traffic, *Airports, *Airplane noise, Jet plane noise, Military aircraft, Jet engine noise, Propeller noise, Runways, Airplane engine noise, Physiology.

A summary and generalization of knowledge is presented on aircraft ground and flight operations in the vicinity of air bases, noise source characteristics of military aircraft, and propagation of sound from aircraft to observers in the vicinity of or on air bases. Data from earlier Air Force studies, together with new

AD-278 836 Div. 15
(TISTP/WH) OTS price $2.60

Ohio State U. Research Foundation, Columbus.
A SUMMARY DISCUSSION OF THE BOX TECHNIQUE FOR EXPLORING RESPONSE SURFACES WITH EMPHASIS ON ROTATABLE DESIGNS.
Rept. on Mathematical Techniques of Aeromechanics,
by Jeanne Truett. Apr 62, 16p. incl. table, 22 refs.
(Contract AF 33(616)6503, Proj. 7071)
(ARL 62-331) Unclassified report

DESCRIPTORS: *Statistical analysis, *Sequential analysis, *Analysis of variance.

A general discussion is given of the technique proposed by Box (J. Roy. Stat. Soc., Ser B, Vol 13:1-4, 1951) for exploring response surfaces. A mathematical formulation of the problem is included, and the successive steps in applying the method to the determination of the functional relation of the response to k independent variables is enumerated. Particular emphasis is given to rotable designs, with discussions of the general theory, of the geometric technique, and of the group theoretic technique. (Author)

16. MEDICAL SCIENCES

AD-278 522 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
SOME EFFECTS OF BODY HEATING PRIOR TO EXTREME COOLING,
by Paul W. Barnett. Oct 61, 16p. incl. illus. tables, 16 refs. (Technical rept. no. 61-27)
(Proj. 8242-1)
Unclassified report

DESCRIPTORS: *Body temperature, Heating, Exposure, Heart, Measurement, Man, Hypothalamus.

This study was performed to determine the effect of body heating prior to extreme cooling. Subjects were heated in a 42 C water bath until heart rates reached 150 beats/minute or rectal temperatures reached 39.5 C. Subjects were exposed, following heating, to ambient air temperatures of 0 C for 30 minutes and -15 C for 60 minutes. No significant change in tolerance times was noted. Total body heating prior to exposure is an ineffective means of extending the human body's tolerance to extreme cold. A discussion of the results is presented. (Author)

AD-278 523 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
TEMPERATURE COMPENSATION FOR THE MERCURY STRAIN GAUGE USED IN DIGITAL PLETHYSMOGRAPHY,
by Nishio Honda. Oct 61, 9p. incl. illus. 7 refs. (Technical rept. no. 61-28)
(Proj. 8237-39; In cooperation with Kentucky U., Lexington)
Unclassified report

DESCRIPTORS: *Strain gages, *Mercury, *Body temperature, *Blood volume, Blood circulation, Copper wire, Measurement, Medical equipment.

The temperature compensation for the mercury-in-rubber strain gauge by a copper wire was examined. It was found that the influence of a temperature change on the resistance of the mercury-in-rubber strain gauge can be adequately compensated for by a fine copper wire. A transient imbalance of the gauge circuit cannot be avoided after the exposure to abrupt temperature change. With the copper compensation wire described, the effect of a slow, irregular temperature change on the resistance of the gauge can be eliminated. The addition of the rubber tube as insulation markedly improves the time-course compensation with abrupt temperature changes. (Author)

AD-278 527 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
SEASONAL VARIATIONS IN THE CALORIC INTAKE OF DOGS LIVING IN AN ARCTIC ENVIRONMENT,
John L. Durrer and John P. Hannon. Oct 61, 10p. incl. illus. 12 refs. (Technical rept. no. 61-33)
(Proj. 8237-33)
Unclassified report

DESCRIPTORS: *Metabolism, *Ecology, Food, Climatic factors, Temperature, Laboratory animals, Dogs, Exposure, Measurement.

The seasonal variations in the average daily caloric intake and body weight of five Husky dogs and five Beagle dogs were measured over twelve and eight-month periods, respectively, during which the average monthly temperature ranged from +17 C to -22 C. The caloric intake of the Huskies rose from a midsummer low of 49 Cal./day to a November high of 87 Cal./day. Mid- and late winter values averaged about 79 Cal./day. During late winter there was no relationship between the day to day temperature and caloric intake. In the Beagles, acute and later chronic exposure to cold in March caused a marked increase (80 to 131 Cal./day) in caloric intake. They, like the Huskies, tended toward minimum values (85 Cal./day) during the summer. With the onset of winter the Beagles increased their intake to a high of 144 Cal./day in November. Over-all, these data showed that the relative magnitude of the seasonal changes were quite similar in both groups of dogs and suggested that seasonal changes in insulation are supplementary to seasonal changes in caloric intake. (Author)

AD-278 528 Div. 16
(TISTB/CCH) OTS price $.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
EFFECT OF VARYING TEMPERATURES ON OXYGEN UPTAKE AND GENERATION TIME OF KLEBSIELLA PNEUMONIAE AND STAPHYLOCOCCUS AUREUS,
by Stanley Marcus, Fred Miya and others. Oct 61, 9p. incl. illus. 2 refs. (Technical rept. no. 61-34)
(Proj. 8241-32; In cooperation with Utah U. Coll. of Medicine, Salt Lake City)
Unclassified report

DESCRIPTORS: *Oxygen consumption, *Bacteria, Temperature, Time, Ecology, Staphylococcus, Klebsiella pneumoniae, Growth.

A study of the effects of temperature on oxygen uptake and generation times of Klebsiella pneumoniae and Staphylococcus aureus was carried out. The results indicate that oxygen uptake varies directly with temperature and still occurs although no measurable growth takes place. The generation times of the agents appear to be independent of temperature between 25 and 37 C but are temperature-dependent at values below 25 C. The main effect of lower temperatures on growth rates appears to be that of increasing the lag phase. (Author)

31 Aug 61 on Design Technologies and Structural Configuration Concepts for Aerospace Vehicles, by J. N. Krusos, A. S. Kjelby and others. May 62, 313p. incl. illus. tables, 65 refs. (Contract AF 33(616)7050, Proj. 1368) (ASD TR 61-706, vol. 2) Unclassified report

DESCRIPTORS: *Beryllium, *Composite structures, *Airframes, Ceramic materials, Aluminum compounds, Silicon compounds, Oxides, Diodes, Foams, High temperature research, Thermal insulation, Shielding, Sheets, Metal plates, Manufacturing methods, Processing, Chemical milling, Brazing, Reinforcing materials, Honeycomb cores, Foils, Alloys, Stainless steel, Tests, Re-entry vehicles.

The methods developed for fabrication of Be sheet composite structures are described. Descriptions and performance evaluation are included for a variety of panels fabricated under the contract consisting of Be load bearing panels and porous ceramic heat shields developed to withstand temperatures in excess of 3000 F. Concepts are outlined defining application of Be-ceramic composites to aerospace vehicle structures. Be sheet fabrication methods and tooling are described and include such processes as cutting, forming, chem-milling, and brazing. Be sheet faces were brazed to a variety of superalloy and stainless steel honeycomb cores. Three basic porous ceramic foams were developed in the heat shield: Al2O3, ZrO2, and SiO2. (Author)

AD-278 554 Div. 17, 25, 30
(TISTM/REB) OTS price $6.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
A STUDY OF THE PLASTIC DEFORMATION OF METALS BY THE OBSERVATION OF SINGLE DISLOCATIONS.
Final rept., 21 Dec 56-28 Feb 62, by H. G. F. Wilsdorf. 28 Feb 62, 1v. incl. illus. tables, refs. (Rept. no. F-A2027)
(Contract AF 49(638)162)
(AFOSR-2777) Unclassified report

DESCRIPTORS: *Plastic flow, *Metals, *Metallic crystals, *Crystal structure, Brass, Test methods, Stresses, Microstructure, Mechanical properties, Electron diffraction analysis, Electron microscopy, Deformation.

Research was aimed to further the understanding of the mechanism of plastic flow in metals. This goal was approached by making use of new submicroscopical techniques which allow atomistic lattice defects to become visible to the naked eye, and by utilizing macroscopic measurements of highest sensitivity. The development and the efforts to perfect three selected experimental techniques, namely, two methods for observing dislocations directly as well as microstrain measurements, are discussed. The results explain the plastic behavior of alpha - brass in terms of glide dislocations which are most important lattice defects responsible for plastic flow in this metal. For the first time, it has been possible to obtain quantitative data pertaining to the general behavior and the motion of dislocations, including the frictional force acting on the dislocations, during glide. (Author)

AD-278 557 Div. 17
(TISTM/MS) OTS price $2.60

General Electric Co., Schenectady, N. Y.
THE TEMPERATURE COEFFICIENT OF RESISTANCE IN ULTRATHIN, EVAPORATED METAL FILMS (INVESTIGATION OF METAL THIN FILM FORMATION AND STRUCTURE).
Final rept., 1 May 59-31 May 62, by C. A. Neugebauer. July 62, 21p. incl. illus. tables, 34 refs. (Rept. no. 62-GC-0215M)
(Contract AF 19(604)5566, Proj. 5621)
(AFCRL 62-342) Unclassified report

DESCRIPTORS: *Metal films, *Thin films, *Metallurgy, Electrical conductance, Temperature, Electron microscopy, Physical properties, Magnetic properties.

It is known that some of the abnormal magnetic properties of ultrathin metal films, and their electrical conduction mechanism, can be explained on the basis of their ''island'' structure. It can be shown that the electrical conductivity and the temperature coefficient of resistance are controlled principally by the radius of the islands and the distances between them. By suitably adjusting these structural parameters, both of which enter the relation for the film conductivity exponentially, one can be made to predominate over the other. Thus, if the islands and the distances between them are small, very large negative temperature coefficients are observed. On the other hand, if the islands are very large or the thermal expansion coefficient of the substrate is unusually high, positive temperature coefficients can be observed, often several times larger than even the bulk values, even for films of resistances as high as 10 to the 6th power omega/square or higher. (Author)

AD-278 574 Div. 17
(TISTM/AW) OTS price $.50

Naval Research Lab., Washington, D. C.
OXIDE BONDING AND THE CREEP-RUPTURE STRENGTH OF NICKEL.
Interim rept., by T. R. Cass and M. R. Achter. 22 June 62, 9p. incl. illus. 9 refs. (NRL rept. no. 5803)
Unclassified report

DESCRIPTORS: *Nickel, *Bonding, *Creep, *Rupture, Measurement, Sintering, Oxides, Oxidation, Fracture (Mechanics).

A technique for measuring the creep and rupture strength of nickel specimens bonded by sintered oxide layers has been developed. This technique is used in the investigation of the role of grain-boundary oxide in the oxidation strengthening of nickel during creep at 817 C. From the inverse dependence of the rate of bonding on the thickness of the starting oxide, it is suggested that the rate of diffusion of Ni(++) through NiO is the controlling process at the start of sintering. Comparisons of the creep and rupture strength and of the microstructure of sintered couples with conventional creep specimens suggest that rupture in nickel is prevented by load-bearing, intergranular layers of oxide. (Author)

AD-278 576 Div. 17, 4
(TISTM/MS) OTS price $1.60

Aeronautical Materials Lab., Naval Air Material Center, Philadelphia, Pa.
THE ROLE OF OXYGEN IN THE BRITTLE BEHAVIOR OF METALS.
Progress rept. no. 7, 1 Sep 61-1 May 62 on Foundational Research, by Edwin S. Tankins. 8 June 62, 5p. tables, 3 refs. (Rept. no. NAMC-AML(9)-R360FR101)
Unclassified report

DESCRIPTORS: *Brittle materials, *Liquid metals, *Metals, Iron alloys, Nickel alloys, Chemical equilibrium, Chemical reactions, Chemical impurities, Thermodynamics, Oxygen.

data, have been summarized and incorporated into aircraft noise prediction procedures and descriptions of operations characteristics. The report provides an integrated presentation of available information and techniques and the factors to be considered in determination of noise from aircraft operations that is intermediate in complexity between a simplified ''handbook'' and the specific, detailed, source material. (Author)

AD-278 653 Div. 16, 1
(TISTE/CCH) OTS price $1.60

Douglas Aircraft Co., Inc., El Segundo, Calif.
NOTES ON THE EFFECTS OF HUMAN ACCELERATION TOLERANCES ON DESIGN FOR THE TERRAIN FOLLOWING AIRCRAFT,
by B. Levedahl. Jan 62, 14p. incl. illus. tables, 11 refs. (Rept. no. ES 40621)
(Contract Nonr-107600)
Unclassified report

DESCRIPTORS: *Acceleration tolerance, *Flight paths, *Aviation accidents, *Terrain, Stress (Physiology), Visual thresholds, Vision, Human engineering, Design, Pilots.

Accelerative forces acting on the pilot serve as a severe limitation on low level, high speed terrain following operations. The physiological restrictions imposed by acceleration forces essentially define the flight path permitted and hence restrict the altitudes that can be maintained over any defined terrain. While some benefit can be derived by the use of anti-g suits for positive g forces, the physiological limitations are not apparent when an attempt is made to control over-shoot after passing over a barrier. At this time negative g forces are applied to the pilot. Some evidence is available to show that repeated application of g-forces may effect physiological parameters other than tolerance and may thus be of importance in defining performance characteristics or limits. More work must be done on the effects of g-loading on these parameters before a reasonable assessment can be made. (Author)

AD-278 673 Div. 16
(TISTB/CCH) OTS price $1.60

Maudsley Hospital (Gt. Brit.).
CHEMICAL FACTORS IN THE EXCITATION OF CEREBRAL TISSUES.
Technical rept.,
by Henry McIlwain. 14 May 62, 10p. illus. table, 13 refs.
(Contract AF 61(052)404)
(AFOSR-3041) Unclassified report

DESCRIPTORS: *Brain, *Chemical properties, *Electrical properties, Stress (Physiology), Biochemistry, Stimulation, Electrodes, Chlorpromazine, Proteins, Laboratory animals, Swine, Cerebral cortex, Tissues (Biology), Chemical reactions.

Apparatus and techniques are described for maintaining isolated mammalian cerebral tissues in an excitable condition. Their excitability has been demonstrated by three types of observation: (1) Measurement of change in chemical composition in response to electrical stimulation. Most attention has been paid to changes in K, Na, and phosphocreatine; (2) Resting membrane potentials have been measured by glass micropipette electrodes, and depolarization demonstrated after applying brief electrical pulses to the tissue; and (3) Occasional spike discharges have been observed on penetrating the tissue with micropipette electrodes. Association between chemical and electrical events in the isolated tissue has been demonstrated in the following situations: (1) During and after electrical stimulation the time-course of change in potential and in Na and K content are similar; and (2) The basic protein clupein was effective in inhibiting active ion movements and in preventing the establishment of normal resting potentials, and in both these actions it was antagonized by ganglioside preparation. (Author)

AD-278 697 Div. 16
(TISTB/MS) OTS price $11.00

North Carolina U., Chapel Hill.
THE INFLUENCE OF PHYSICAL CHARACTERISTICS, PSYCHOLOGICAL FACTORS, AND DRUGS ON THE CAPACITY OF MAN TO WORK IN THE HEAT.
Final rept., 1 June 58-1 June 62,
by Carl S. Blyth, B. W. Lovingood, and W. H. Peacock. 1 July 62, 118p. incl. illus. tables, 40 refs.
(Contract DA 49-007-md-949)
Unclassified report

DESCRIPTORS: *Drugs, *Stress (Physiology), *Stress (Psychology), Physiology, Measurement, Exercise, Caffeine, Heat tolerance.

AD-278 833 Div. 16
(TISTB/CCH) OTS price $2.00

Minneapolis-Honeywell Regulator Co., Minn.
WATER RECOVERY BY REITERATIVE FREEZING.
Final rept., 15 Apr-15 Oct 61 on Equipment for Life Support in Aerospace,
by Jack Beutel. Mar 62, 65p. incl. illus. tables, 3 refs.
(Contract AF 33(616)8170, Proj. 6373)
(MRL TDR 62-14) Unclassified report

DESCRIPTORS: *Water, *Recovery, *Space flight, *Space medicine, *Closed-cycle ecological systems, Urine.

A method of recovering potable water from urine by employing the differences in solute concentration of a liquid-ice phase system as a means of purification is discussed. This method is called reiterative freezing. A parameter of the solute concentration distribution, called the effective distribution coefficient, is defined; and a number of experimental conditions for which the effective distribution coefficient is calculated are described. The effect upon the attainable separation due to rate of freezing, agitation, and direction of freezing with respect to the gravity direction is discussed. The effective distribution coefficients obtained for these experimental conditions are compared with the distribution coefficients attainable under ideal conditions. The effect of freezing upon the distribution of micro-organisms is discussed. The energy requirements for the recovery of potable water from urine by various reiterative freezing schemes are calculated as a function of the yield and of the volume of liquid that must be frozen to recover a unit volume of potable water containing less than 500 parts per million of solids. A comparison is made between these energy requirements and the energy requirements of a simple distillation process. (Author)

17. METALLURGY

AD-278 526 Div. 17, 14
(TISTM/GEC) OTS price $5.00

Aeronca Mfg. Corp., Middletown, Ohio.
BERYLLIUM COMPOSITE STRUCTURES. VOLUME II. MATERIALS AND PROCESSES.
Final technical engineering rept., 4 Feb 60-

AD-278 723 Div. 17, 26
(TISTM/REB) OTS price $3.50

Defense Metals Information Center, Columbus, Ohio.
BERYLLIUM FOR STRUCTURAL APPLICATIONS. A REVIEW OF THE UNCLASSIFIED LITERATURE, 1958-1960,
by Webster Hodge. 18 May 62, 1v. incl. illus. tables, 186 refs. (DMIC rept. no. 168)
(Contract AF 33(616)7747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: *Beryllium, *Bibliography, *Beryllium alloys, Metallurgy, Manufacturing methods, Processing, Composite materials.

Reports of Government-supported research on the physical and process metallurgy of beryllium that were received at DMIC during the period 1958-1960, inclusive, are summarized, together with some reports and publications of foreign authors. No proprietary or classified information is included. In addition, reference is made to some of the more important writings on health hazards and safety procedures that appeared during the period covered. (Author)

AD-278 737 Div. 17, 15
(TISTM/TCG) OTS price $1.60

Mathematics Research Center, U..of Wisconsin, Madison.
TRANSITION THEORY OF SHEET-BENDING,
by B. R. Seth. May 62, 11p. 4 refs. (MRC Technical summary rept. no. 326)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Metals, *Sheets, Theory, Phase transitions, Elasticity, Plasticity, Deformation, Stresses, Equations, Deflection, Mathematical analysis.

Transition theory of elastic-plastic deformation, developed in recent papers, is applied to the plastic bending of a rectangular sheet. No semi-empirical yield condition is assumed. It comes out of th equations. Further, the orthogonality assumption shows that the only possible form when it becomes plastic is circular. The analysis also separates the two regions of yielding under extension and compression, which correspond to the turning points of the non-linear differential equations arising out of the equations of equilibrium. (Author)

AD-278 801 Div. 17
(TISTM/MS) OTS price $2.50

Michigan U., Ann Arbor.
WIDE-TEMPERATURE-RANGE SPRINGS.
Final rept., 1 Feb 59-30 Sep 61 on Metallic Materials,
by H. Gascoigne, J. H. Enns and others. May 62, 96p. incl. illus. table, 6 refs.
(Contract AF 33(616)6284, Proj. 7351)
(ASD TR 61-566) Unclassified report

DESCRIPTORS: *Springs, Nickel alloys, Iron alloys, Ferromagnetic materials, Stainless steel, Chromium alloys, Glass, Ceramic fibers, Ceramic materials, Thermal stresses, Shear stresses, Elasticity, Temperature, Load distribution, Effectiveness.

Bimetallic spring systems of 40% nickel-60% iron alloy combined with Inconel X and type 304 stainless steel exhibit characteristics suitable for applications from -65 to 600 F. In this range the spring constant is held within ±0.25%. The general theory of bimetallic, temperature independent helical coil and Belleville type springs is presented. The bimetallic systems tested show that a temperature independent spring is feasible although working stresses must be maintained at relatively low levels. (Author)

AD-278 803 Div. 17
(TISTM/AW) OTS price $2.50

Directorate of Materials and Processes, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
MATERIALS CENTRAL-ASM METALLURGICAL EDUCATIONAL LECTURES.
Final rept.,
by M. G. Fontana, A. M. Hall and others.
May 62, 102p. incl. illus. tables, 15 refs.
(Proj. 7381)
(ASD TDR 62-396) Unclassified report

Presented on March 1, 8, 22, and 29 at the National Cash Register Company, Dayton, Ohio.

DESCRIPTORS: *Conferences, *Failure (Mechanics), *Corrosion, *Lubrication, Thermal stresses, Alloys, Temperature, Fatigue (Mechanics), Fracture (Mechanics), Metals, Air force research, Analysis, Countermeasures.

A series of lectures on failure analysis is presented. Causes, cures, and preventive measures of corrosion are discussed. The general types of elevated-temperature service failure are described and the influence of static and dynamic loading, thermal cycling, corrosion, and inert environments are discussed. The sensitivity of present high strength structural alloys to brittle failure under various environmental and state of stress conditions is included. Present Air Force research efforts on the characteristic behavior of high strength materials are reviewed. This includes the relationship between mechanical wear and lubrication. A description of the interaction between two contacting solids causing wear and the basic principles of lubrication and lubrication techniques are given. (Author)

AD-278 807 Div. 17, 14, 26
(TISTM/EJH) OTS price $4.00

Brush Beryllium Co., Cleveland, Ohio.
INVESTIGATION OF THE EFFECTS OF PROCESSING VARIABLES AND FABRICATION TECHNIQUES UPON THE PROPERTIES OF INTERMETALLIC COMPOUNDS.
Final rept., 1 Apr 60-30 Sep 61 on Materials Application,
by Richard S. Truesdale, Byron B. Lympany and others. June 62, 251p. incl. illus. tables, 42 refs.
(Contract AF 33(616)7108, Proj. 7381)
(ASD TDR 62-476) Unclassified report

DESCRIPTORS: *Intermetallic compounds, *Refractory materials, *Beryllium compounds, *Niobium compounds, Powder metals, Tantalum compounds, Manufacturing methods, Sintering, Casting, Extrusion, Flame spraying, Stability, Mechanical properties, Deformation, Microstructure, Metal forming presses, Forging, Processing.

Intermetallic compounds of NbBe12, Nb2Be17, Nb2Be19, and Ta2Be17 were fabricated by uniaxial pressing and sintering techniques. Results of sintering studies on Nb2Be17 are discussed. The effects of particle size, stoichiometry, temperature, and time upon the sintered density, grain size, and strength of Nb2Be17 are described. A modulus of rupture evaluation is made on Nb2Be17 up to 2750 F, and results of tensile, Young's modulus, thermal conductivity, and oxidation studies are discussed. The feasibility of

Division 17 - METALLURGY

AD-278 630 Div. 17
(TISTM/JSM) OTS price $1.60

Aeronautical Materials Lab., Naval Air Material Center, Philadelphia, Pa.
INFLUENCE OF BORON, TITANIUM, ALUMINUM, AND ZIRCONIUM ON HIGH TEMPERATURE PROPERTIES OF Fe-Cr-Ni ALLOYS,
by William A. Sipes. 12 July 62, 20p. incl. illus. (Rept. no. NAMC-AML-1464)
Unclassified report

DESCRIPTORS: *Iron alloys, *Chromium alloys, *Nickel alloys, *Additives, *High temperature research, Boron, Titanium, Aluminum, Zirconium, Boron alloys, Titanium alloys, Aluminum alloys, Zirconium alloys, Stainless steel, Austenite, Rupture, Stresses.

To confirm the beneficial effects claimed for minor alloying additions of incongruous elements, producer's experimental Fe-Cr-Ni alloys so modified were studied in connection with their suitability for use as aircraft power plant materials. The alloys were W-545 (Westinghouse) and Unitemp 212 (Universal Cyclops). The W-545 alloy may be considered an Fe-Cr-Ni-Mo alloy, a boron modification of Discalloy. Both materials could be included in the more general classification of austenitic precipitation hardenable stainless steels. The stress-rupture test data for the W-545 alloy, except for the value obtained at 1300 F which was 10,000 psi lower, agreed with the producer's published values for the material. Except for the anomaly noted, W-545, on an equal strength basis, can be used at a temperature 100 F higher than Discalloy, an alloy not having the boron addition. The Unitemp 212 stress-rupture data confirm the producer's published values. Conclusions: W-545 and Unitemp 212 demonstrate the beneficial effects of incongruous alloy additions. Fe-Cr-Ni alloys, as well as other austenitic alloys (iron-nickel-manganese) can be greatly benefited by judicious additions of incongruous alloying elements.

AD-278 652 Div. 17
(TISTM/MS) OTS price $1.75

Defense Metals Information Center, Columbus, Ohio.
THE EFFECTS OF SOLUTES ON THE DUCTILE-TO-BRITTLE TRANSITION IN REFRACTORY METALS,
by G. T. Hahn, A. Gilbert, and R. I. Jaffee. 28 June 62, 58p. incl. illus. tables, 83 refs.
(DMIC memo. no. 155)
(Contract AF 18(600)1375)
Unclassified report

DESCRIPTORS: *Refractory materials, *Metals, *Transition elements, Solubility, Brittle materials, Deformation, Additives, Phase transitions, Mechanical properties.

There appear to be two ways in which interstitials promote brittle behavior in Groups V-A and VI-A refractory metals: (1) By locating at the grain boundaries in the form of segregates of precipitates, promoting grain-boundary rupture and crack initiation; and (2) In solid solution by inhibiting dislocation movement and reducing the resistance to crack propagation. Both embrittling effects operate in Group VI-A metals; whereas, only the latter is significant in the Group V-A at the levels of purity currently achieved. The problem of reducing the low-temperature brittleness of Group V-A metals is readily solved through the purity route. Purification of Group V-A metals to interstitial levels well below the solubility limits may be readily accomplished either in the initial purification of the base metal or during melting or consolidation. There are three possible routes to solving the problem of the embrittling effect of interstitials on the Group VI-A metals: (1) the purity route, (2) through working, and (3) through alloying (thermodynamically through strong scavengers, by additions which modify the electron bonding, and via grain-refining dispersions). (Author)

AD-278 670 Div. 17
(TISTM/AW) OTS price $2.00

Directorate of Materials and Processes, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
ELEVATED TEMPERATURE CREEP PROPERTIES OF FOUR MARTENSITIC HIGH STRENGTH STEELS IN SHEET FORM. Rept. for Feb 58-Nov 60,
by V. F. Lardenoit. May 62, 70p. incl. illus. tables, 2 refs.
(Proj. 7381)
(ASD TDR 62-358) Unclassified report

DESCRIPTORS: *Steel, Martensite, Sheets, Tool steel, Stainless steel, Alloys, Heat resistant alloys, High temperature research, Tests, Tensile properties, Rupture, Deformation, Time, Data, Creep.

The creep properties of four martensitic steels in sheet form were determined. Materials tested included Unimach 2 (Thermold J) and Potomac M, both of which are Hot Work Tool Steels, USS 12 MoV, a Martensitic Stainless Steel and 17-22A (S), a Low Alloy Martensitic Steel. Test temperatures were 600 F, 800 F, and 900 F for the Unimach 2 (Thermold J) and USS 12 MoV, 800 F, 1000 F, and 1050 F for the 17-22A (S) and 600 F, 800 F, and 1000 F for the Potomac M. Data includes ultimate tensile strength, tensile yield strength and creep rupture properties. The data are presented in tabular and graphical form depicting creep deformations of 0.05%, 0.10%, 0.30%, 0.50%, and 1.0% in times ranging from 10 to 1000 hours. Where available, rupture data is also presented. (Author)

AD-278 710 Div. 17, 26
(TISTM/EJH) OTS price $4.60

Republic Aviation Corp., Mineola, N. Y.
EVALUATION OF HIGH-STRENGTH LIGHTWEIGHT LAMINATED PRESSURE VESSELS OF LAP-JOINT CONSTRUCTION. Quarterly progress rept. no. 2, 1 Mar-31 May 62,
by R. E. Stegler. 16 June 62, 45p. incl. illus. tables (Rept. no. RAC 807; MSD 244-3002)
(Contract DA 30-069-ORD-3440, Proj. 59332008)
(WAL TR 766.2/3-1) Unclassified report

DESCRIPTORS: *Rocket cases, *Pressure vessels, *Steel, *Metal joints, *Welded joints, Nickel alloys, Cobalt alloys, Molybdenum alloys, Welding, Welds, Mechanical properties, Tensile properties, Fracture (Mechnics), Sheets, Cylindrical bodies, Specifications, Materials, Pressure vessels.

The evaluation of the production-type, 18-7-5 (INCO 250 KSI) and 18-9-5 (INCO 300 KSI) NiCoMo, mar-aging steels was completed to the extent required to ensure their suitability for this program. A final selection of the 18-9-5 (INCO 300 KSI) composition was made. The material specification was revised as required, and the pressure-vessel material was ordered. The basic tool design and a major portion of the tool fabrication were completed. The lap-shear test program was started, and preliminary subscale ring-sizing tests were performed successfully. (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-278 413 Div. 20
(TISTP/WH) OTS price $11.00

Illinois U., Urbana.
PHOTOMESON PRODUCTION FROM NEUTRONS BOUND IN HELIUM AND DEUTERIUM,
by Arthur B. C. Walker, Jr., James H. Smith, and Louis J. Koester, Jr. June 62, 143p. incl. illus. tables, 89 refs. (Technical rept. no. 41)
(Contract Nonr-183405)
Unclassified report

DESCRIPTORS: *Photonuclear reactions, *Mesons, *Helium, *Deuterium, *Pions, *Photons, Meson scattering.

Photomeson production from neutrons bound in helium and deuterium was investigated by simultaneously measuring the angle and energy of the meson and the recoil proton. 270 Mev bremsstrahlung was used and, in this experiment, only pions at 75 degrees in the laboratory were measured. This corresponds roughly to 90 degrees in the center of mass system of the photon and struck neutron. The angular distributions were interpreted to give the internal nuclear momentum distribution of the parent neutron by comparing the experimental data with a calculation based on the impulse approximation. The deuterium data agree both in shape and in absolute magnitude with predictions based on the Hulthen wave function. The helium data indicate that the neutrons involved in photomeson production have fewer high momentum components in their wavefunctions than those found from other types of experiments. This result is interpreted as evidence for the reabsorption of mesons by the parent nucleon and another nucleon interacting strongly with it, to produce pseudodeuteron photodisintegrations. (Author)

AD-278 467 Div. 20
(TISTP/WH) OTS price $6.60

RAND Corp., Santa Monica, Calif.
A METHOD OF CORRELATING CRITICAL CONDITIONS OF HOMOGENEOUS BARE REACTORS CONTAINING A RESONANCE ABSORBER,
by B. Pinkel, G. B. W. Young, and A. Leonard. May 62, 59p. incl. illus. tables, 3 refs. (Memo. no. RM-2940-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Homogeneous reactors, *Critical assemblies, *Resonance absorption, *Uranium, *Fission neutrons, *Reactor kinetics.

The effect on reactor criticality of a material having strong resonance absorption bands is discussed. Whereas current methods for calculating the effect of various materials on the uranium requirement of the reactor involve the use of electronic computers, the simplified method presented enables calculation to be made rapidly by hand. (Author)

AD-278 477 Div. 20
(TISTP/TL) OTS price $3.60

RAND Corp., Santa Monica, Calif.
SOLUTIONS TO THE CRITICALITY PROBLEM FOR SPHERES AND SLABS,
by A. Leonard and T. W. Mullikin. July 62, 27p. incl. 10 refs. (Memo. no. RM-3256-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Sheets, *Spheres, *Homogeneous reactors, *Neutrons, *Scattering, *Integral transforms, Density, Integral equations, Critical assemblies.

A study is presented of the problem of determining the relation between the critical size of homogeneous slab and spherical reactors and neutron production, with the assumption that the energy of neutrons is constant. Equations are derived for the slab with anisotropic scattering, the solution of these equations is studied for isotropic scattering. (Author)

AD-278 578 Div. 20, 4
(TISTM/REB) OTS price $1.60

National Bureau of Standards, Washington, D. C.
GAMMA IRRADIATION OF FLUOROCARBON POLYMERS AND SMALL MOLECULES.
Final technical rept. on Solid State Research and Properties of Matter,
by L. A. Wall and R. E. Florin. May 62, 8p. 8 refs.
(Contract AF 33(616)60-4, Proj. 7023)
(ARL 62-350) Unclassified report

DESCRIPTORS: *Fluorocarbons, *Polymers, *Molecules, *Free radicals, Physical properties, Radiochemistry, Polymerization, Gamma rays, Radiation effects.

Work upon the effects of gamma irradiation on fluorocarbon polymers and small molecules is summarized, including a list of publications. Recent extensions are mentioned. The subject matter includes physical properties (principally zero-strength-times and tensile strengths); volatile products; effects of oxygen and chlorine atmospheres; radiation chemistry of perfluoroheptane, hexafluorobenzene and mixtures; sensitizing of radiation--induced polymerization; and yields of radicals by electron spin resonance. (Author)

AD-278 597 Div. 20
(TISTP/WH) OTS price $1.60

United States Rubber Co., Wayne, N. J.
DECAY STUDIES OF THE EVEN-EVEN ISOTOPES, ER-172 AND DY-166,
by Ray Gunnink and A. W. Stoner. 1962, 17p. incl. illus. table, refs. (Contribution no. 220)
(Contract AF 49(638)815)
(AFOSR-1900) Unclassified report

DESCRIPTORS: *Erbium, *Thulium, *Dysprosium, *Radioactive isotopes, *Neutron capture, Gamma rays.

Er-172 and Dy-166 with half-lives of 48.7 ± 0.5 hours and 81.3 ± 0.2 hours respectively were produced by double neutron capture from Er-170 and Dy-164. (Author)

AD-278 614 Div. 20
(TISTP/FR) OTS price $5.60

Naval Radiological Defense Lab., San Francisco, Calif.
RESPONSE REQUIREMENTS FOR MILITARY RADIACS. 3. APPLICATION OF A RELIABILITY PREDICTION TECHNIQUE TO A NAVY RADIAC,
by J. A. Kunzman and H. R. Wasson. 11 June 62, 51p. incl. illus. tables, 11 refs. (NRDL-TR-567)
Unclassified report

DESCRIPTORS: *Radiation counters, Reliability, Statistical analysis, Tests.

scaling-up to large and complicated shapes by isostatic pressing, slip casting, extrusion, hot pressing, and flame spraying is demonstrated. The temperature-pressure-flow characteristics of several beryllides at temperatures of 2750 to 3050 F are evaluated together with microstructural stability. The metallurgical fabrication techniques of forging, forming, and rolling as applied to Nb2Be17 are examined. (Author)

AD-278 826 Div. 17, 10
(TISTM/TCG) OTS price $1.25

Little, Arthur D., Inc., Cambridge, Mass.
KINETICS OF OXIDATION IN THE Mo-Si SYSTEM.
Final rept., Sep 60-Sep 61 on Refractory, Inorganic and Non-Metallic Materials,
by Joan Berkowitz. May 62, 42p. incl. illus. tables, 28 refs.
(Contract AF 33(616)6154, Proj. 1(8-7350))
(ASD TDR 62-203, pt. 1) Unclassified report

DESCRIPTORS: *Molybdenum, *Molybdenum compounds, *Silicides, *Reaction kinetics, *Oxidation, Silicon, Silicon compounds, Intermetallic compounds, Chemical reactions, Oxidation inhibitors, Vaporization, Phase studies, Thermal conductivity, Test equipment, Oxides, Films, Growth.

The oxidation behavior of Mo, Mo3Si, Mo5Si3, and MoSi2 was studied at temperatures between 1000 and 1725 C at oxygen partial pressures less than 20 mm. Pure Mo metal oxidizes linearly in this range, with a ratio constant k=k(sub o)1(-22,000/RT)p(0.87), where p is oxygen partial pressure, the gas constant R is in cal/mole, T is in K, and k(sub o) is a constant independent of temperature and pressure. To a good approximation, oxidation of the Mo silicides follows a logarithmic rate law, Q=Q(sub o)(1-1(-alpha t), where Q is the total oxygen consumed between time zero and time t, while Q(sub o) and alpha are constants, dependent upon composition, pressure and temperature. At any fixed temperature, the most oxidation resistant material is MoSi2; Mo5Si3 is oxidized to a larger extent before a protective coating is established, and Mo3Si is oxidized still more extensively. The rates of oxidation of all 3 compounds eventually reaches a low-limiting value. Metallographic examinations established that oxidation proceeds at least in part by diffusion of oxygen inward. An apparatus utilizing a thermal conductivity bridge is described for continuous measurement of the rate of oxidation of metallic materials at temperatures between 900 and 2100 C. (Author)

AD-278 847 Div. 17
(TISTM/AW) OTS price $2.00

Manufacturing Labs., Inc., Cambridge, Mass.
EFFECT OF MECHANICAL AND THERMAL PROCESSING ON HIGH STRENGTH STEELS.
Final technical rept.,
by P. J. Fopiano, S. Das Gupta, and D. Kalish.
June 62, 67p. incl. illus. tables, 7 refs.
(Contract DA 19-020-ORD-5253, Proj. 593-32-008)
(WAL TR 320.4/4-3) Unclassified report

DESCRIPTORS: *Steel, *Processing, Mechanical properties, Aging, Failure (Mechanics), Austenite, Martensite, Heat treatment, Tensile properties, Deformation, Hardening, Time, Cooling, Rocket cases, Tests, Electron microscopy, Impact shock, Temperature, Test methods, Stresses.

The relationship between the strain to which rocket motor cases were subjected during proof testing and subsequent premature failure was investigated. Two aspects of the role of strain on the mechanical properties of H-11 steel were considered. The first is the effect of strain on the retained austenite and the second is the effect of strain and subsequent aging on the tempered martensite. In addition, electron microscopic observations were carried out for selected conditions of heat treatment. Two major findings of this investigation are the significant increase in both yield and ultimate tensile strengths as the result of the strain aging treatments and the improved toughness in both the unstrained and strain-and-aged conditions as the result of tempering at a temperature considerably lower than in standard commercial practice. (Author)

18. MILITARY SCIENCES AND OPERATIONS

AD-278 584 Div. 18, 2
(TISTM/MS) OTS price $4.60

Quartermaster Research and Engineering Command, Natick, Mass.
NOTES ON SOME ENVIRONMENTAL CONDITIONS AFFECTING MILITARY LOGISTICS IN THAILAND.
June 62, 41p. incl. illus. tables, 18 refs.
(Special rept. no. S-1)
Unclassified report

Orginal contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Thailand, *Logistics, Military operations, Climate, Precipitation, Diet, Food, Insects, Pest control, Snake bites, Insect bites, Climatic factors.

Thailand's climate is characterized by a rainy and a dry season, except for small areas of year-long wet conditions. Shortage of potable water is a problem in much of the country especially during the dry season. The dietary structure of the Thai people reflects a crucial dependence on rice for all meals. Of secondary importance are fish, vegetables, and fruit. Too great a dependence on a single food type, coupled with long-practiced dietary habits and taboos that depress the consumption of available foods, such as eggs, creates a problem of malnutrition in the form of deficiency diseases. Nevertheless, Thailand is a food-surplus nation. Mosquitoes, flies, biting gnats, midges, mites, lice, ticks, spiders, scorpions, and leeches are common pests in Thailand. Insects and similar pests, because of their presence, bites, and stings, can lower the morale of even well-seasoned troops. Insect-borne diseases remain a problem even with military personnel possessing innoculative immunity. It is necessary to maintain preventive measures for disease control in Thailand. Anti-venom should be available for all field personnel. (Author)

19. NAVIGATION

No Entries

projectiles against 0.100-inch thick 2024-T4 aluminum target plates. Angles of obliquity between the velocity and the target surface for these experiments were 90, 50, and 20 degrees. Curves, photographs, and flash radiographs illustrating the data are presented. (Author)

AD-278 545 Div. 22, 30
(TISTW/JRG) OTS price $7.60

Ballistic Analysis Lab., Johns Hopkins U., Baltimore, Md.
THE CALIBRATION OF A COLLECTION MEDIUM FOR THE DETERMINATION OF PARTICLE VELOCITY.
July 62, 73p. incl. illus. tables (Proj. Thor technical rept. no. 50)
(Contract DA 36-034-509-ORD-29, Proj. TB3-0238)
Unclassified report

DESCRIPTORS: *Hypervelocity projectiles, *Ammunition fragments, *Particles, *Velocity, Vulnerability, Fiberboard, Targets, Plastics, Aluminum alloys, Magnesium alloys, Steel, Tungsten alloys, Fragmentation, Collecting methods, Penetration, Mathematical analysis, Errors, Terminal ballistics, Calibration, Test methods, Measurement.

A useful calibration of a medium for estimating particle velocities over a broad range of particle sizes, velocities, materials, and obliquities of impact is provided. Compact fragments of plastic, Mg alloy, Al alloy, steel, and W alloy have been used in single-fragment firings against fiberboard to produce the needed experimental data. A single empirical formula has been fitted to the data, relating striking velocity to the impact parameters of thickness of medium penetrated, angle of obliquity of strike, particle size, and presented area. An effort has also been made to determine limiting impact conditions for each fragment material for which the fragment will remain essentially intact during the penetration. Whenever the fragment breaks up or deforms excessively during the penetration, the velocity estimates are no longer valid. (Author)

AD-278 556 Div. 22
(TISTW/EET) OTS price $6.60

Pitman-Dunn Labs. Group, Frankford Arsenal, Philadelphia, Pa.
DEVELOPMENT AND QUALIFICATION OF THRUSTER, CARTRIDGE ACTUATED, T26,
by C. Glaser. May 62, 61p. incl. illus. tables.
(Rept. no. R-1636)
(DA Proj. 5S02-06-001)
Unclassified report

DESCRIPTORS: *Cartridges, *Explosive actuators, *Ejector cartridges, *Ejection seats, Propellants, Release mechanisms, Jettisonable equipment, Firing mechanisms, Ejection, Jet bombers, Design, Tests, Aviation safety.

Thruster, Cartridge Actuated, T26, a column stowage thruster for the B52 escape system, is a modification of Thruster, Cartridge Actuated, M3A1. The design of the M3A1 thruster was simplified, the weight was reduced, and the performance improved. The M3A1 body was changed from two pieces to one of unit construction; the cartridge retainer was eliminated; a more effective humidity seal was placed at the piston rod end and the O-ring seals were relocated. The M3A1 thruster weighed approximately one lb; however, the redesigned T26 thruster, complete with cartridge, weighs 9.67 oz. The design modifications reduced the heat losses and the chamber volume; higher pressures were obtained during thruster function and at the end of the bypass hose. When the piston stroked 1.5 inches, a 550-pound load was moved approximately 4.0 inches. The bypass pressure was increased from 600 psi at the end of a 4-foot hose to 1000 psi (minimum) at the end of a 10-foot flexible hose. (Author)

AD-278 641 Div. 22
(TISTW/JRG) OTS price $1.60

Bureau of Mines, Pittsburgh, Pa.
HYPERVELOCITY IMPACT PHENOMENA.
Quarterly rept., 1 Mar-31 May 62,
by Karl R. Becker, Richard W. Watson, and Frank C. Gibson. 22 June 62, 38p. incl. illus. tables.
Unclassified report

DESCRIPTORS: *Hypervelocity projectiles, *Aluminum alloys, *Metal plates, *Sheets, Particles, Alloys, Lead, Penetration, Cratering, Analysis, Hypersonics, Effectiveness, Ammunition fragments, Terminal ballistics, Spallation, Failure (Mechanics).

The parameters governing the failure of thin metal plates under the impact of high-speed fragments are being studied; special emphasis is placed on the lightweight structural alloys. The geometrical features of the perforations, together with the spatial, mass, and velocity distributions of the ejecta produced in the perforation process, are considered. A few select target materials e.g., Al and Pb are currently being investigated under impact conditions that involve the same projectile geometry but different impact velocities. (Author)

AD-278 832 Div. 22
(TISTW/PCR) OTS price $2.60

Naval Weapons Lab., Dahlgren, Va.
SERIES AND PARALLEL ARRANGEMENTS OF ELECTRICALLY INITIATED EXPLOSIVES,
by R. I. Gray. July 62, 18p. incl. illus. tables, 3 refs. (Technical memo. no. W-7/62)
Unclassified report

DESCRIPTORS: *Electric igniters, Reliability, Wiring diagrams, Probability.

The over-all electrical reliability of any system in which component inputs are inter-connected can be derived from a modified form of the Binomial Probability Theorem using the functional relationship of the outputs to determine the relevant group probability. In applying this theory to wire bridge fuzes (squibs) it is found that if short-circuit and open-circuit input defects are equally likely, a series input arrangement is more reliable electrically, than is a parallel arrangement, which is perhaps contrary to common belief. When the electrical defect probabilities are very small a series arrangement is more or less reliable than a parallel arrangement according as the probability of a short-circuit is greater or less than that of an open-circuit. (Author)

23. PERSONNEL AND TRAINING

AD-278 708 Div. 23
(TISTB/AW) OTS price $6.60

6570th Personnel Research Lab., Aerospace Medical Div., Lackland Air Force Base, Tex.
JOB ANALYSIS BIBLIOGRAPHY,
by Joseph E. Morsh. Mar 62, 59p. refs.
(Rept. no. PRL TDR 62-2)
(Proj. 7734) Unclassified report

An established reliability prediction technique (NAVSHIPS 900-193, TR1100) has been applied to a recent portable radiac, the AN/PDR-27(J). This theoretical analysis yielded a probable Mean-Time-Between-Failures (MTBF) of 5056 hr with an uncertainty of ± 40 percent. A debugging period of 160 hr was also predicted. The theoretical analysis was confirmed by a laboratory test of 100 instruments operating for 1,000 hr. An exponential life curve was demonstrated with an MTBF of approximately 7,000 hr. The range for a 90 percent confidence level was from 4,840 to 12,250 hr. The empirical debugging period was about 98 hr. Conclusions are drawn concerning the utility of applying this type of reliability analysis to small portable radiac devices. (Author)

AD-278 672 Div. 20
(TISTP/FR) OTS price $1.60

North Carolina U., Chapel Hill.
DELINEATION OF TRACKS OF HEAVY COSMIC RAYS AND NUCLEAR PROCESSES WITHIN LARGE CRYSTALS OF SILVER CHLORIDE,
by Charles B. Childs and Lawrence M. Slifkin.
July 62, 9p. illus. 16 refs.
(Contract AF 49(638)865)
(AFOSR-3030) Unclassified report

DESCRIPTORS: *Cosmic rays, *Silver compounds, *Chlorides, Crystals.

Tracks of energetic charged particles, such as heavy primary cosmic rays and the products of nuclear collisions, were made visible within the interior of large, transparent crystals of silver chloride. The tracks are delineated by photoelectric formation of metallic silver along them. This technique may be useful as a convenient and distortion-free method for the study of heavy primaries and fission fragments. (Author)

AD-278 674 Div. 20, 8
(TISTB/AW) OTS price $3.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
RADIATION EFFECTS ON COAXIAL CABLES AND INSULATION: AN ANNOTATED BIBLIOGRAPHY,
comp. by William L. Hollister. Apr 62, 33p.
(Special bibliography no. SB-62-12; Rept. no. 3-88-62-1)
(Contract AF 04(647)840)
Unclassified report

DESCRIPTORS: *Bibliography, *Radiation effects, *Coaxial cables, *Electric insulation, Electrical equipment, Radiation damage, Ionization.

This bibliography was compiled in connection with a study of the radiation effects on electrical equipment. Information was gathered on the effects of mixed reactor radiation on transients and damage effects in both coaxial cables and electric insulation materials. The sources consulted include the holdings of LMSC Technical Information Center, report literature, recent journals, symposia, and conferences. The search was completed in February 1962. (Author)

AD-278 818 Div. 20, 14
(TISTM/AW) OTS price $9.10

General Dynamics/Fort Worth, Tex.
EFFECTS OF REACTOR RADIATION ON THE ENGINEERING PROPERTIES OF ELASTOMERS AND PLASTICS,
by J. B. Wattier, D. M. Newell, and L. L. Morgan.
June 62, 115p. incl. illus. tables, 15 refs.
(Document no. NARF-62-5T; FZK-9-174)
(Contract AF 33(657)7201)
Unclassified report

DESCRIPTORS: *Plastics, *Elastomers, *Radiation effects, *Radiation damage, Silicones, Nitrile rubber, Urethanes, Butadienes, Fluorocarbons, Polymers, Rubber, Ethylenes, Fluorides, Temperature, Air, Statistical analysis, Tensile properties, Gamma rays, Nuclear physics laboratories.

A summary and analysis of the effects of radiation on the properties of certain elastomers and plastics are given. Irradiations were conducted during 1958-1961 at various temperatures in a variety of media. The information is limited to data on sheet-stock elastomers and plastics. (Author)

21. NUCLEAR PROPULSION

No Entries

22. ORDNANCE

AD-278 412 Div. 22
(TISTW/EET) OTS price $2.60

Hughes Tool Co., Culver City, Calif.
THE HIPEG SYSTEM (20MM AIRCRAFT GUN MK 11 AND GUN POD EX 1),
Progress rept. for May 62.
May 62, 14p. illus. tables (Rept. no. HTC-62-39)
(Contract NOrd-19180-c)
Unclassified report

DESCRIPTORS: *Aircraft guns, Flight testing, Reliability, Guns, Gun barrels, Failure (Mechanics), Armor piercing ammunition, Tracers (Ordnance), Tests, Instrumentation, Test methods.

Discussion covers the firing of rounds from the Mk 4 pod and its Mk 11 gun in the reliability test program. A description of stoppages, manufacturing errors, personnel errors, loader, gun mechanism failures and liquid spring tests are also presented.

AD-278 537 Div. 22
(TISTM/AW) OTS price $8.10

Aerojet-General Corp., Downey, Calif.
IMPACT AND PENETRATION OF 0.100-INCH ALUMINUM PLATES BY ALUMINUM PROJECTILES AT 29,000-33,000 FEET PER SECOND.
Final rept.,
by K. W. Kreyenhagen, J. E. Ferguson, and R. R. Randall. July 62, 83p. incl. illus. tables, 2 refs.
(Contract AF 08(635)975, Proj. 5841)
(APGC TDR 62-40) Unclassified report

DESCRIPTORS: *Hypervelocity projectiles, *Terminal ballistics, Penetration, Aluminum, Shaped charges, Jets, Fragmentation, Instrumentation, Fragmentation ammunition.

The Shaped Charge Hypervelocity Projectile Accelerator is being used to study impact and penetration effects upon relatively thin targets at velocities between 29,000 and 38,000 feet per second. This special report presents and analyzes 128 data points gathered for impacts in the 29,000-33,000 feet per second range with aluminum

25. PHYSICS

AD-278 416 Div. 25
(TISTP/WH) OTS price $10.10

Massachusetts Inst. of Tech., Cambridge.
SOLID-STATE AND MOLECULAR THEORY GROUP.
Quarterly progress rept. no. 45.
15 July 62, 118p. incl. illus. tables, refs.
(Contracts Nonr-184134 and AF 19(604)8445)
Unclassified report

DESCRIPTORS: *Scientific research, *Solid state physics, *Molecules, Magnetic properties, Rare earths, Ions, Brillouin zones, Methanes, Benzenes, Superconductivity.

Contents:
A theoretical investigation of some magnetic and spectroscopic properties of rare-earth ions, A. J. Freeman, R. E. Watson
Neutron magnetic form factors and X-ray atomic scattering factors for rare-earth ions, M. Blume, A. J. Freeman, and R. E. Watson
Exchange splittings of L-S multiplets or rare earth ions in crystals, G. F. Koster
Atomic many-body problem. II. The matrix components of the Hamiltonian with respect to correlated wave functions, L. Szasz
Energy bands for the iron transition series, L. F. Mattheiss
Energy band calculations, F. W. Quelle
Methane, B. J. Woznick
Benzene, J. W. Moskowitz
H sub 2 - H sub 2 Interaction, A. Williams
Adiabatic approximations and superconductivity theories, R. Englman

AD-278 417 Div. 25
(TISTM/EJH) OTS price $4.60

Louvain U. (Belgium).
ION PRODUCTION AND CONCENTRATION IN FLAMES.
Annual summary rept. no. 2,
by A. Van Tiggelen, H. Philippaerts and others.
May 62, 30p. incl. illus. tables, 19 refs.
(Contract AF 61(052)398)
(ARL 62-379) Unclassified report

DESCRIPTORS: *Flames, *Combustion, *Ions, *Gas ionization, Mass spectroscopy, Spectrographic analysis, Luminescence, Photoemission, Laboratory equipment, Methanes, Oxygen, Fuels, Exhaust gases, Free radicals, Measurement, Electrical equipment, Electrical conductance, Production.

An improved method for the measurement of flame conductivity is described. It takes into account the perturbing side effects which interfere in flame conductimetry measurements. Methane-oxygen flames (with or without additives) were investigated. A comparative study is presented between ion concentration and the intensity of the different band spectra which are emitted in the same flames. A correlation between the OH* emission and the amount of ions was experimentally established. New improved equipment for ion extraction and identification in flames will make possible the investigation of any kind of flame burning at atmospheric pressure.

AD-278 418 Div. 25
(TISTP/FR) OTS price $3.60

Lowell Technological Inst. Research Foundation, Mass.
EFFECTS OF EXTERNAL FORCES ON VIBRATING CRYSTAL PLATES.
Quarterly rept. no. 4, 1 Feb-30 Apr 62,
by Charles R. Mingins, Luther C. Barcus, and Robert W. Perry. 30 Apr 62, 36p. incl. illus. tables, 2 refs.
(Contract DA 36-039-sc-87198, Proj. 3G26-05-001)
Unclassified report

DESCRIPTORS: *Quartz crystals, Stresses, Pressure, Plasticity, Vibration, Instrumentation.

Compression stress-frequency curves for BT-cut piezoids so far show less symmetry than expected. Examination of the interquadrantal regions for this cut show no experimental evidence of discontinuities in the deviation function or in its derivatives. Numerous tests of equation (6) against experimental data, mostly AT, using new Bechmann values for the elastic and piezoelectric matrix elements, show a superior fit. Effective widths and cross-section areas of the vibrating region as seen by the force field are calculated. Possible reasons for the smallness of the values obtained are discussed. A more detailed description is given of the apparatus for producing controlled, steady, compressional and flexural stresses. (Author)

AD-278 429 Div. 25
(TISTM/EJH) OTS price $1.10

Colorado U., Boulder.
NUCLEAR RESONANCE OF Al IN SYNTHETIC RUBY.
Final rept.,
by Walter H. Tanttila. June 62, 9p. 4 refs.
(Contract AF 49(638)611)
(AFOSR-2768) Unclassified report

DESCRIPTORS: *Ruby, *Lithium compounds, *Paramagnetic crystals, *Aluminum, Nuclear magnetic resonance, Nuclear resonance, Chemical impurities, Paramagnetic resonance, Phase studies, Microwave spectroscopy, Hyperfine structure, Fluorides, Chlorides, Manganese, Ions, Aluminum compounds, Oxides, Synthetic gems.

Initial studies on the nuclear magnetic resonance of Al in ruby are summarized. LiCl containing Mn ion impurities was prepared. Nuclear resonance studies were performed on the Li at room temperature, liquid N and liquid He temperature. Electron paramagnetic resonance studies were performed at room temperature on the Mn ions. The Mn appeared to exist in the crystal in 2 phases, dilute and concentrated. In the dilute phase the Mn ion concentration in the host LiCl was 0.2 mole-%; in the concentrated phase the Mn ion concentration was 100%, indicating precipitation as a pure crystal. LiF with Mn ion impurity was also prepared. The microwave spectrum indicated that up to concentrations of 10 mole-% of Mn there is no tendency of the Mn ions to form 2 phases or to precipitate separately from the LiF; there was no measurable diffusion of ions at room temperature. Other experiments included a search for an electric hexadecapole moment in In and Sb.

AD-278 434 Div. 25, 15
(TISTP/JW) OTS price $4.60

Stanford U., Calif.
SPONTANEOUS BREAKDOWN OF ELEMENTARY PARTICLE SYMMETRIES,
by M. Baker and S. L. Glashow. June 62, 37p. illus. 14 refs. (Technical note no. 63)
(Contract AF 49(638)388)
(AFOSR-2943)
Unclassified report

DESCRIPTORS: *Numerical analysis, *Quantum mechanics, Perturbation theory, Electrons, Spin, Isotopes, Particles.

DESCRIPTORS: *Job analysis, *Bibliography, Air Force, Analysis.

The job analysis bibliography lists 1500 titles appearing between 1911 and 1961. It is especially comprehensive in its coverage of papers, both published and unpublished, issued by Department of Defense agencies and their contractors. Entries are indexed by subject. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-278 420 Div. 24, 18
(TISTA/VGW) OTS price $7.60

Aero Service Corp., Philadelphia, Pa.
MANUAL FOR SCREENING SMALL SCALE AERIAL PHOTOGRAPHY.
May 61, 72p. incl. illus.
(Contract AF 30(602)1879)
(RADC TR 60-102) Unclassified report

DESCRIPTORS: *Aerial photography, *Aerial reconnaissance, *Photo interpretation, Surface targets, Target recognition, Military intelligence, Photographic analysis, Instruction manuals, Photo interpretability, High altitude, Handbooks.

This manual is designed as an aid to rapid identification and analysis of military targets on low image-quality, non-stereoscopic, aerial photography obtained from very high altitudes. Methods are presented for screening of photography and analysis of significant targets at the low image quality represented by 100-foot ground resolution, and an evaluation is given of the interpretability of selected targets at increments of better image quality up to 20-foot ground resolution. The manual consists of four parts: Part I provides an introduction to problems involved in interpretation of 100-foot ground resolution photography. Included is a brief discussion of the meaning of 100-foot ground resolution; definitions of terms and techniques; a guide to effective photo scanning, and an explanation of a method of target categorization designed to facilitate rapid extraction of intelligence from this photography. Part II covers the identification clues and the scope of analysis possible for each of nine target categories at 100-foot ground resolution. Part III contains selected examples of 100-foot ground resolution photography from which extraction of maximum information is illustrated in step-by-step interpretation procedures. Part IV describes the interpretability of photography at improved ground resolutions up to and including 20 feet for two selected targets, airfields and petroleum installations.

by the usual energy minimization procedure. The method was applied to the calculation of the ground state energy of molecular hydrogen. (Author)

AD-278 446 Div. 25
(TISTP/JW) OTS price $1.60

Minnesota U., Minneapolis.
DIFFUSION AND VISCOUS FLOW IN CONCENTRATED SUSPENSIONS,
by Stephen Prager. June 62, 18p. 8 refs. (Technical rept. no. 4)
(Contract AF 49(638)720)
(AFOSR-2803) Unclassified report

DESCRIPTORS: *Fluid flow, *Viscosity, Diffusion, Entropy, Liquids, Solids, Solutions, Particles.

The principle of minimum entropy production is applied to obtain bounds on the diffusion coefficient of a solute in a suspension of solid particles, as well as on the viscosity of the suspension. These bounds involve certain two- and three-point correlations characterizing the geometry of the liquid-solid interface, but are not in any way dependent upon the adoption of a simplified model to represent the system. In particular, it is not necessary to assume that the suspended particles are too far apart to interact with one another, and the theory is therefore valid even when the volume fraction of solid is high. (Author)

AD-278 447 Div. 25
(TISTP/JW) OTS price $11.00

Naval Supersonic Lab., Mass. Inst. of Tech., Cambridge.
HEAT TRANSFER RATES AND INSULATED WALL TEMPERATURES FOR A TRANSPIRATION COOLED HEMISPHERE,
by Albert F. Gollnick, Jr. Dec 60, 135p. incl. illus. 29 refs. (Technical rept. no. 433)
(Contract AF 49(638)245)
(AFOSR TN 60-1483) Unclassified report

DESCRIPTORS: *Thermal diffusion, *Heat transfer, *Boundary layer, Temperature, Helium, Wind tunnels, Cooling, Fluid flow, Ablation, Hemispherical shells.

Existing solutions to the boundary layer equations with helium injection and constant free stream pressure gradient are used to calculate the injection distribution on a hemisphere required to maintain a constant wall temperature. The method used is an extension of the wedge-matching technique. The fabrication and calibration of a wind tunnel model designed on this basis is described. The resulting distributions of wall temperature, insulated wall temperature and Stanton number are presented, and the variation of these quantities with injection rate, using air and helium as coolants. The design technique proved satisfactory. The insulated wall temperature near the nose, for helium injection, is nearly ten per cent higher than the tunnel stagnation temperature. It is suggested that this may result from the thermal diffusion of the helium within the boundary layer. The Stanton numbers obtained with air and helium agree with theoretical predictions, and the corresponding heat fluxes demonstrate that mass transfer cooling on a blunt body is very effective. On the other hand, the anticipated superiority of helium over air does not occur, since the adverse effect of helium injection on the insulated wall temperature negates the corresponding reduction in heat transfer coefficient. (Author)

AD-278 451 Div. 25, 7, 14
(TISTM/EJH) OTS price $1.10

Titanium Alloy Mfg. Div., National Lead Co., Niagara Falls, N. Y.
THERMOELECTRIC MATERIALS.
Bi-monthly progress rept. no. 11, 1 Sep-31 Oct 61, by Merton H. Brooks. 15 Nov 61, 3p. illus. tables.
(Contract NObs-78326)
Unclassified report

DESCRIPTORS: *Thermoelectricity, *Electric power production, *Ceramic materials, *Rare earth compounds, Rare earths, Density, Porosity, Materials, Oxides, Niobates, Yttrium compounds, Lanthanum compounds, Niobium compounds, Cerium compounds, Chromium compounds, Preparation, Bismuth compounds, Antimony compounds, Molybdenum compounds, Tungsten compounds, Lead compounds, Electrical properties, Resistance, High temperature research.

Preparation of materials: Multiple oxides: Additions of TiO2, ZrO2, CeO2 and SnO2 to YCrO3 were prepared. X-ray diffraction data established the synthesis of various niobate materials. Fabrication of shapes: Standard ceramic bodies of the following materials were fabricated: additions of Y2O3, La2O3 and Nb2O5 to CeO2; CdO, Bi2O3, Sb2O5, MoO3 and WO3 to PbNb2O6 or Pb2N6207. Percentage compositions and ceramic properties of the materials are tabulated. Forty-two of the compositions were screened electrically and the following properties tabulated: temperature, Seebeck coefficient, resistivity. Four compositions containing additions of 0.5, 1.0, 5.0 and 2.0 mol/% Nb2O5 to CeO2 exhibited low enough resistivity to be graphically represented.

AD-278 452 Div. 25, 7, 4
(TISTM/EJH) OTS price $1.60

Titanium Alloy Mfg. Div., National Lead Co., Niagara Falls, N. Y.
THERMOELECTRIC MATERIALS.
Bi-monthly progress rept. no. 12, 1 Nov-31 Dec 61. 15 Jan 62, 3p. tables.
(Contract NObs-78326)
Unclassified report

DESCRIPTORS: *Thermoelectricity, *Electric power production, *Ceramic materials, *Rare earth compounds, *Rare earths, Preparation, Materials, Oxides, Yttrium compounds, Chromium compounds, Titanium compounds, Zirconium compounds, Cerium compounds, Lead compounds, Niobates, Porosity, Bismuth compounds, Cadmium compounds, Antimony compounds, Tungsten compounds, Molybdenum compounds, Electrical properties, Resistance, High temperature research, Density.

Fabrication of shapes: Simple oxides - Standard Ceramic Bodies of UO2 additions to CeO2 were formed; Multiple oxides - Standard Ceramic Bodies of YCrO3 with Standard Series addition of TiO2, CeO2, ZrO2 were fabricated and their pertinent ceramic properties tabulated. Standard Ceramic Bodies of additions of SnO2 to YCrO3 were formed as well as those of LaCrO3 with additions of TiO2, CrO2, ZrO2, SNO2. Temperature, Seebeck coefficient and resistivity values are tabulated for 47 Standard Ceramic Body compositions. PbNb2O6 with 0.5 m/% Bi2O3 had the largest negative Seebeck coefficient, of moderate consistency with temperature, of any material thus far measured. Following this and of same general characteristic are: PbNb2O6 plus 0.1 mol/% sb2O5; PbNb2O6 plus 5.0 mol/% CdO; and Pb2Nb2O7 plus 5.0 mol/% CdO.

Non-perturbative solutions of quantum field theory are sought. A model is considered which possesses the higher symmetry SU(3). It is found that without the introduction into the Lagrangian of any symmetry-breaking terms, solutions exist which have only the lower symmetries of isotopic spin and hyperchange. It is also shown that the usual electrodynamic interaction of the muons and the electrons allows the possibility of generating a mass splitting between them. Finally a Lagrangian is considered in which the bare coupling constants are set equal to zero, and self-generated renormalized coupling constants are found. (Author)

AD-278 435 Div. 25
(TISTP/WH) OTS price $2.60

Stanford U., Calif.
FORMAL SIMILARITIES OF WEAK, STRONG AND ELECTROMAGNETIC INTERACTIONS,
by M. Baker and S. L. Glashow. June 62, 20p. incl. illus. 9 refs. (Technical note no 64)
(Contract AF 49(638)388, Proj. 9750-37500)
(AFOSR-2942) Unclassified report

DESCRIPTORS: *Nucleons, *Parity, *Electromagnetic waves, *Nuclear reactions, Quantum mechanics.

It is pointed out that the weak, strong and electromagnetic interactions may possess formal similarities. In particular the weak interactions if taken alone may conserve parity. The observed violation of parity in nature is then attributed to the conflicting symmetries of the weak and strong interactions taken together. (Author)

AD-278 436 Div. 25
(TISTP/WH) OTS price $1.10

Stanford U., Calif.
QUANTIZATION OF A SELF-COUPLED BOSON FIELD,
by L. I. Schiff. June 62, 6p. (Technical note no. 65)
(Contract AF 49(638)388)
(AFOSR-2941) Unclassified report

DESCRIPTORS: *Nuclear resonance, *Mesons, *Pions, *Quantum mechanics, Matrix algebra, Integral transforms, Operators (Mathematics).

A new method is proposed for the quantization of self-coupled boson fields. The field is analyzed in terms of Hermitian amplitudes of an expansion in plane waves, and the wave function of the system is expressed in terms of these amplitudes. The field Hamiltonian then becomes a differential operator. The variational method is applied, using a trial function that consists of products of arbitrary functions of the mode amplitudes that refer to equal and opposite momenta. Explicit expressions for the vacuum, one-particle, and two-particle states are obtained, and the rest mass and coupling constant are renormalized. There is only S wave scattering in this approximation, and there can be an S wave bound state of two particles if the renormalized coupling constant is sufficiently large and negative. (Author)

AD-278 437 Div. 25
(TISTP/WH) OTS price $1.60

Stanford U., Calif.
GENERAL RELATIVITY: THEORY AND EXPERIMENT,
by L. I. Schiff. June 62, 11p. 9 refs.
(Technical note no. 67)
(Contract AF 49(638)388, Proj. 9750-37500)
(AFOSR-2940) Unclassified report

DESCRIPTORS: *Relativity theory, *Gravity, *Gyroscopes, Spin.

A review is given of the way in which each of the three so-called ''crucial tests'' of general relativity theory (red shift, deflection of light, planetary orbit precession) relate to parameters of the theory. A fourth, recently proposed, experiment is also discussed from the same point of view. This consists of the measurement of the precession rate of the spin axis of a spherical gyroscope that moves through the earth's gravitational field. (Author)

AD-278 442 Div. 25
(TISTP/FR) OTS price $1.10

Institute of Science and Tech., U. of Michigan, Ann Arbor.
MODE SELECTION AND ENHANCEMENT WITH A RUBY LASER. Information note of Proj. Michigan,
by John A. Baker and C. W. Peters. July 62, 5p. incl. illus. (Rept. no. 2900-365-1)
(Contract DA 36-039-sc-78801)
Unclassified report

DESCRIPTORS: *Lasers, Ruby, Light, Scattering, Optical systems.

The angular distribution of the laser output from a ruby rod is determined by the characteristics of the standing-wave pattern inducing the emission. If the angular spread of the pattern is limited by an aperture in an external optical system through which the standing wave must pass, the stimulated emission will be limited to the same angular spread. In addition, the suppression of the standing wave pattern in off-axis directions will increase the intensity of the laser beam along the axis, since that part of the stimulated emission which normally would have gone into the off-axis modes will be channeled into the axial modes. (Author)

AD-278 445 Div. 25
(TISTP/TL) OTS price $1.60

Minnesota U., Minneapolis.
USE OF ELECTROSTATIC VARIATION PRINCIPLES IN MOLECULAR ENERGY CALCULATIONS,
by David M. Schrader and Stephen Prager. June 62, 16p. incl. tables, 6 refs. (Technical rept. no. 3)
(Contract AF 49(638)720)
(AFOSR-2802) Unclassified report

DESCRIPTORS: *Electrostatics, *Quantum mechanics, *Hydrogen, *Atomic structure, Molecules, Energy, Electrons, Electric fields, Atomic orbitals, Integral equations, Differential equations, Inequalities, Potential theory.

The Thomson and Dirichlet principles of electrostatics were applied to the evaluation of electron interaction terms occurring in molecular energy calculations. A suitable choice of certain trial electric fields and electrostatic potentials permits these terms to be approximated both from above and from below. These approximate calculations of electronic interaction terms are considerably easier to perform than the exact evaluations required when molecular energies are obtained in the usual way through the minimum energy principle. At the same time, when the upper and lower bounds obtained by the present method are properly inserted into the total energy expression, the validity of the minimum energy principle is preserved, so that any parameters appearing in the trial wave function can still be evaluated

DESCRIPTORS: *Fog, *Aerosols, *Light, *Scattering, *Polarization, *Absorption, Optics, Series, Integration, Particles.

The angular scattering and polarization properties of polydispersed suspensions of nonabsorbing and partially absorbing spheres have been computed using the complete Mie series. The results with three types of size distributions are presented and compared with observations. These show a strong dependence of angular intensity and polarization patterns on the size distribution, the size range, and the dielectric and absorbing properties of the individual particles. A peculiarity of scattering at angles near 45 degrees, observed experimentally and independently by two authors, is corroborated by the numerical results. Prominent observational features characteristic of natural fog, such as an extremely bright aureole, rainbows and counter coronas are reproduced in a model corresponding to a cloud of spherical water droplets, with a wide distribution in droplet radius and a maximum concentration at a 4-micron radius. (Author)

AD-278 498 Div. 25, 26
(TISTM/EJH) OTS price $1.60

TYCO, Inc., Waltham, Mass.
THE TRAVELLING SOLVENT METHOD OF CRYSTAL GROWTH.
Quarterly rept. no. 4, 15 Feb-15 May 62,
by M. Weinstein, S. D. Axelrod, and A. I. Mlavsky.
14 June 62, 17p. incl. illus. tables.
(Contract AF 19(604)8803, Proj. 4608)
(AFCRL-62-503)
Unclassified report

DESCRIPTORS: *Semiconductors, *Single crystals, *Intermetallic compounds, Impurities, Electrical properties, Hall effect, Gallium, Gallium compounds, Arsenides, Zone melting, Chromium, Silicon compounds, Carbides, Deposits, Metallic smoke deposits, Sandwich construction, Melting, Electron beams, Manufacturing methods, Growth.

Contents:
Cr-SiC System
- Hall effect and resistivity measurements of selected SiC chips
- Continuation of the deposition of Cr from chromium dicumene
- Electron beam melting of Cr on SiC
- Wetting studies of Cr on SiC in different ambients
- Etching studies in molten salts
- Zone movement studies

Ga-GaAs System
- P-N junction formation by solvent doping

AD-278 505 Div. 25
(TISTM/EJH) OTS price $1.10

Uppsala U. (Sweden).
REMARKS ON THE QUANTUM MECHANICAL INTERPRETATION OF THE STARK EFFECT IN THE HYDROGEN ATOM,
by L. B. Redei. 15 Dec 61, 6p. incl. table, 6 refs. (Technical note no. 73)
(Contract AF 61(052)351)
(ARL-256)
Unclassified report

DESCRIPTORS: *Quantum mechanics, *Hydrogen, *Electron transitions, Perturbation theory, Atomic energy levels, Theory, Electric fields.

It is known that when applying perturbation theory in the quantum mechanical treatment of the Stark effect, the perturbation expansion diverges even for very weak fields. It is shown that a plausible modification of the boundary conditions makes the power series convergent at least for those states which are associated with the principal quantum numbers n = 1, 2, 3, 4 for up to about 10 to the 5th power volt/cm field strength. In case of the ground state (n = 1) the radius of convergence obtained will be at least 2.5 (10 to the 6th power volt/cm). (Author)

AD-278 511 Div. 25, 2
(TISTP/WH) OTS price $3.60

Western Ontario U. (Canada).
MOLECULAR EXCITATION GROUP.
Final rept.,
by R. W. Nicholls. 1 June 62, 34p. incl. tables.
(Contracts AF 19(604)1718 and AF 19(604)4560, Proj. 7635)
(AFCRL 62-699) Unclassified report

DESCRIPTORS: *Scientific research, *Astrophysics, *Molecular spectroscopy, Excitation.

Contents:
Experimental Studies
- Intensity measurements of molecular band systems
- Identification atlas of molecular spectra
- Combustion spectroscopy
- Shock excitation of powdered solids
- Spectroscopy of ion beams
- Plasma jet spectroscopy
- Corona spectroscopy
- Molecular lifetime measurements

Theoretical Studies
- Vibrational wave functions
- Franck-Condon factors
- r-Centroids
- Molecular potentials
- Atomic collisions

AD-278 533 Div. 25
(TISTP/WH) OTS price $1.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SETTLEMENT AND TILTING OF FOOTINGS ON A VISCOUS FOUNDATION,
by Arnold D. Kerr. Mar 62, 12p. incl. illus. 6 refs. (Research rept. no. 81)
(Proj. 8-66-02-400)
Unclassified report

DESCRIPTORS: *Foundations (Structures), *Snow, *Elasticity, *Plasticity, *Creep.

In this paper the concept of the Pasternak foundation, consisting of the Winkler foundation with shear interactions, is extended to the case of viscous behavior. The differential equation for the vertical surface displacements is formulated and solutions for several loading cases are worked out. Two material parameters enter the analysis: the viscosity parameter related to the shear deformations and a visco-compressibility parameter of the vertical foundation elements. A procedure to determine these parameters is suggested. The application of this analysis to the creep behavior of snow foundations is discussed. (Author)

AD-278 534 Div. 25
(TISTP/JW) OTS price $6.60

Aerospace Corp., El Segundo, Calif.
EFFECT OF DISCONTINUITY OF SURFACE CATALYCITY ON BOUNDARY LAYER FLOW OF DISSOCIATED GAS,
by P. M. Chung, S. W. Liu, and H. Mirels.
7 June 62, 52p. incl. illus. table, 22 refs.
(Rept. no. TDR-69(2240-20)TN-1)
(Contract AF 04(695)69)
(DCAS TDR 62-126) Unclassified report

Division 25 - PHYSICS

AD-278 461 Div. 25
(TISTM/EJH) OTS price $1.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
NOTE ON TWO-DIMENSIONAL STRESSES IN LONG BEAM WITH SPANWISE VARIATION OF LOAD AND TEMPERATURE.
Interim technical rept., 1 Feb 60-30 June 61 on Mechanisms of Ductility and Fracture,
by B. E. Gatewood and Ralph Dale. Apr 62, 9p. incl. illus. 8 refs.
(Contract AF 33(616)6996, Proj. 7063; In cooperation with Ohio State U., Contract AF 33(616)8330)
(ARL 62-329) Unclassified report

DESCRIPTORS: *Stresses, *Thermal stresses, *Beams, Loading, Temperature, Theory, Mathematical analysis, Differential equations, Algebra.

Three different methods have been presented in the literature showing how to express the two-dimensional stresses in the beam in a series involving the derivatives of the bending moment produced by a varying load on the beam. One of these methods has been used to show that the two-dimensional thermal stresses can be expressed in a series involving the derivatives of the temperature. In all cases, only the first two or three terms in the series have been presented. This report shows a simple algebraic method of obtaining the terms in the series for both load and temperature and gives the first five or six terms for each stress. (Author)

AD-278 463 Div. 25, 8
(TISTP/TL) OTS price $6.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
SUMMARY OF PROGRESS IN GENERAL LINEAR NETWORKS 1 OCTOBER 1960-30 SEPTEMBER 1961,
by L. I. Smilen. 12 Jan 62, 63p. incl. illus. refs. (Rept. no. PIBMRI-988-62)
(Contract AF 30(602)2213, Proj. 8505)
(RADC TDR 62-143)
Unclassified report

DESCRIPTORS: *Electrical networks, *Solid state physics, Analysis, Synthesis, Circuits, Broadband, Amplifiers, Microwave amplifiers, Parametric amplifiers, Radiofrequency filters, Diodes, Scattering, Semiconductors, Transmission lines, Coaxial cables, Variable capacitors, Linear systems, Microwave frequency, Theory.

Research in network theory and practice is described with emphasis on unconventional techniques and circuit elements carried out for lumped, distributed, and active systems during the time interval from October 1960 to October 1961. The results reported in active network theory include a general synthesis method for the most general, rational, n x n immittance matrix. Methods for the synthesis of broadband solid state amplifiers are described. Various results in distributed parameter network theory are given and methods for their application to microwave filter theory are discussed. The research has shown how many of the network concepts known for lumped parameter and passive systems can be extended to the domain of microwave and active networks. This in turn has lead to the solution of several theoretical, as well as practical, problems at microwave frequencies. (Author)

AD-278 465 Div. 25, 26, 4
(TISTM/EJH) OTS price $5.60

Pennsalt Chemicals Corp., Philadelphia, Pa.
CRYSTAL GROWTH OF FLUOALUMINATES,
by C. W. Graver, F. D. Loomis, and I. Mockrin. June 62, 46p. incl. illus. tables, 9 refs.
(Technical rept. no. 5)
(Contract Nonr-314200, Proj. NR 356-423)
Unclassified report

DESCRIPTORS: *Fluorides, *Aluminates, *Single crystals, *Crystals, Films, Sheets, Manufacturing methods, Vapor plating, Laboratory equipment, Crystal ovens, Flame spraying, Potassium compounds, Synthesis, Physical properties, Mechanical properties, Growth.

Methods of growing fluoaluminate sheet crystals and the formation of fluoaluminate films were investigated. The various processes studied included the Bridgman method, the Chalmers method, the Czochralski method, spraying molten KAlF4, vapor deposition of KAlF4, and a hot wire technique. Attempts to form reconstituted KAlF4 sheet were unsuccessful. The most promising process was the Czochralski crystallization method. For success, very precise control of the process variables, such as pulling rate, seed crystal temperature, cooling rate and melt temperature is necessary. The Bridgman method did not show promise in this study because of unexpected difficult cleavability of the crystal masses obtained.

AD-278 473 Div. 25
(TISTP/TL) OTS price $4.60

RAND Corp., Santa Monica, Calif.
SIMILARITY SOLUTION FOR CYLINDRICAL MAGNETOHYDRODYNAMIC BLAST WAVES,
by Carl Greifinger and Julian D. Cole. July 62, 37p. incl. illus. table, 5 refs. (Memo. no. RM-3054-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Magnetohydrodynamics, *Shock waves, *Gas flow, *Gas ionization, *Plasma physics, *Magnetic fields, *Electric discharges, Electrical conductance, Circuits, Energy, Partial differential equations, Numerical analysis, Integration, Differential equations, Blast.

This analysis is primarily concerned with the interaction between the flow of an ionized gas and a magnetic field. The particular problem treated corresponds very closely to conditions existing in exploding wire experiments, and should prove useful in interpreting the results of such experiments. (Author)

AD-278 479 Div. 25
(TISTP/FR) OTS price $2.60

Royal Inst. of Tech. (Sweden).
SPEECH ANALYSIS TECHNIQUES.
Quarterly progress rept. no. 6, 1 Jan-31 Mar 62,
by Gunnar Fant and Arne Risberg. 31 Mar 62, 11p. illus. 6 refs. (Rept. no. 7)
(Contract DA 91-591-EUC-1496)
Unclassified report

DESCRIPTORS: *Speech, Analysis, Instrumentation, Auditory perception, Speech transmission.

AD-278 489 Div. 25
(TISTP/WH) OTS price $3.60

RAND Corp., Santa Monica, Calif.
SCATTERING AND POLARIZATION PROPERTIES OF POLYDISPERSED SUSPENSIONS WITH PARTIAL ABSORPTION,
by D. Deirmendjian. July 62, 34p. incl. illus. table, refs. (Research memo. no. RM-3228-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

about 300 A, dislocations formed a network with particles at the nodes and in Ni-Al, dislocation tangles formed round each particle. In Ni-Al, particles substantially reduced or even eliminated the temperature dependence of the flow stress. This was first attributed to the elimination of thermally activated cross slip, but electron microscopic observations did not show cross slip to be common in the solid solution. (Author)

AD-278 563 Div. 25
(TISTP/WH) OTS price $2.60

Coordinated Science Lab., U. of Illinois, Urbana.
COLLISION CROSS SECTION OF SLOW ELECTRONS AND IONS WITH CESIUM ATOMS,
by C. L. Chen and M. Raether. May 62, 23p. incl. illus. 16 refs. (Rept. no. R-137)
(Contract DA 36-039-sc-85122)
Unclassified report

DESCRIPTORS: *Microwaves, *Interferometers, *Elastic scattering, *Electrons, *Ions, *Cesium, *Probability.

Microwave interferometry is adopted to measure the effective collision cross section for momentum transfer $\bar{Q}_m$ of thermal electrons (of mean energies of ~0.06 to 0.071 eV) with cesium atoms in the afterglow of pure cesium and helium-cesium discharges. The momentum transfer cross section $\bar{Q}_m$ is found to be best represented by $1.61 \times 10^{-10} T_e^{-1} - 9.63 \times 10^{-12} T_e^{-1/2} + 2.03 \times 10^{-13}$ cm^2 in the temperature range of approximately 450° to 550°K. The energy dependence of the elastic electron-cesium-atom collision probability for momentum transfer is determined to be $P_m = 997 u^{-1} - 4810 u^{-1/2} + 7230$ cm^{-1} where u is the energy of the electrons in electron volts. This shows a smooth tendency to join Brode's data at higher electron energies. Mobilities of Cs^+ ions in helium and in cesium have been determined from the helium-cesium mixture experiments in the same temperature range. They are $\mu(Cs^+$ in He) = 18.5 ± 0.5 cm^2/volt-sec, and $\mu(Cs^+$ in Cs) = 0.4 ± 0.05 cm^2/volt-sec referred to standard gas density (i.e., 2.69×10^{19}/cm^3). (Author)

AD-278 564 Div. 25
(TISTP/FR) OTS price $2.60

Coordinated Science Lab., U. of Illinois, Urbana.
ELECTRICAL BREAKDOWN IN HIGH VACUUM,
by D. Alpert and D. Lee. 7 June 62, 27p. incl. illus. (Rept. no. R-129)
(Contract DA 36-039-sc-85122)
Unclassified report

DESCRIPTORS: *Electric discharges, *Electric arcs, *Electrodes, Electric fields, Vacuum systems.

The phenomenon of charge transfer which occurs when a potential difference is applied between electrodes in a high vacuum is discussed. The nature of prebreakdown currents and material transfer is related to the initiation of an arc between the electrodes. Gap spacings and vacuum conditions are considered. Some recent results for small gap spacings in ultrahigh vacuum are described, and a self-consistent picture proposed for the phenomena is observed. (Author)

AD-278 565 Div. 25
(TISTP/FR) OTS price $7.60

Litton Systems, Inc., Waltham, Mass.
VOICE IDENTIFICATION GENERAL CRITERIA,
by J. Edie and G. Sebestyen. 16 May 62, 66p. incl. illus. tables.
(Contract AF 30(602)2499, Proj. 4027)
(RADC TDR 62-278) Unclassified report

DESCRIPTORS: *Speech, *Speech representation, Acoustics, Identification.

Results of an experimental study program for the development of methods for extracting those parameters which characterize speaker identity are given. A number of parameters were investigated and the method of processing a parametric description of the speaker's voice was developed. Speaker recognition parameters fall into two classes, those that detect speech mannerisms and those that are associated with the instantaneous sounds the speaker utters. Although many mannerism characteristics were found useful, such as the duty cycle of voiced-unvoiced decisions, for the most part differences in the spectral characteristics of speaker sounds were exploited in this program. Positions of the first four formant frequencies, the instantaneous pitch frequency, the instantaneous voice amplitude, time derivatives of these six parameters and of voiced-unvoiced switching signal constitute the final set of 13 speech parameters used in the study. (Author)

AD-278 568 Div. 25
(TISTW/RD) OTS price $5.60

Microwave Associates, Inc., Burlington, Mass.
INVESTIGATION OF HIGH FREQUENCY GASEOUS BREAKDOWN UNDER CONDITIONS OF NON-UNIFORM ELECTRIC FIELDS.
Final rept., 1 Jan 61-1 Jan 62,
by Harvey Fields. 1 Jan 62, 31p. illus. table, 16 refs.
(Contract AF 19(604)7388)
(AFCRL 62-364)
Unclassified report

DESCRIPTORS: *Gas discharges, *Electric discharges, High frequency, Microwaves, Electric fields, Ionization, Gases, Diffusion, Cavity resonators, Microwave frequency, X band.

A study of microwave breakdown in strongly non-uniform electric fields has been performed. Breakdown fields in air have been measured in three resonant cavities at X-band frequencies. One cavity was designed to provide uniform field breakdown, while the other two had strong field gradients. Effective diffusion lengths for the non-uniform field cavities were calculated, by making use of the variational theory for non-uniform field breakdown. The experimental results for the uniform field cavity are in good agreement with theory; however, the observed data for the non-uniform field cavities shows only fair agreement with theory. The discrepancy between theory and experiment in the diffusion region is not unexpected, considering the assumptions that were made in the theory. However, the discrepancy in the attachment region of the experiments is unexpected and suggest the possibility that an additional mechanism may play a significant role in non-uniform field breakdown. (Author)

AD-278 570 Div. 25
(TISTP/FR) OTS price $2.75

Heat Transfer Lab., U. of Minn., Minneapolis.
AN INVESTIGATION OF THE ANODE LOSSES IN ARGON

DESCRIPTORS: *Gas flow, *Heat transfer, *Catalysis, Hypersonic flow, Boundary layer, Gases, Surfaces, Atoms, Dissociation, Hypervelocity vehicles.

The catalytic recombination of atoms along a surface with a discontinuous variation of the surface catalycity is studied. The catalycity is considered to have a discrete jump from either zero or infinity to an arbitrarily constant value at a given location. Highly cooled hypersonic boundary layers are considered for general two-dimensional and axisymmetric bodies. Two approaches are used in the study: a Volterra integral equation which is solved by both a series method and a numerical method and a modified Pohlhausen integral method. The effect of noncatalytic upstream surface on the heat transfer to downstream surface with a finite catalycity is discussed. Also, a method is advanced to increase the sensitivity of a double-surface catalytic gage used for the diagnostics of high temperature experimental facilities. (Author)

AD-278 542 Div. 25, 17
(TISTM/REB) OTS price $3.60

Boeing Scientific Research Labs., Seattle, Wash.
THE ANALYSIS OF FRACTURE SURFACES BY ELECTRON MICROSCOPY,
by Corey McMillan and Regis M. N. Pelloux.
May 62, 24p. illus. 14 refs. (Rept. no. D1-82-0169)
Unclassified report

Also available from the author.

DESCRIPTORS: *Fracture (Mechanics), *Surface properties, *Surfaces, Metals, Alloys, Electron microscopy, Steel, Aluminum alloys.

The fracture surfaces of metals and alloys exhibit different characteristic features which are related to the different mechanisms of crack initiation and propagation. These features can be easily differentiated by electron microscopy. The work reviews and illustrates the different observations made on the fracture surfaces of steels and aluminum alloys resulting from brittle, ductile, fatigue, and intergranular fractures. The investigation of the intergranular fracture of A.I.S.I. 4340 steel parts during service is described and the causes of fracture are discussed. Suggestions are made for the use and development of the techniques and findings of electron microfractography in the investigation of the causes of service failures. (Author)

AD-278 543 Div. 25
(TISTP/JW) OTS price $2.60

Brown U., Div. of Applied Mathematics, Providence, R. I.
ON RECOVERABLE INTERNAL ENERGY IN LINEAR VISCOELASTICITY,
by S. Breuer and E. T. Onat. July 62, 28p. 7 refs. (Technical rept. no. C11-82)
(Contract Nonr-56210, Proj. 064-406)
Unclassified report

DESCRIPTORS: *Viscosity, *Elasticity, *Deformation, Energy, Heat transfer, Solids, Relaxation time, Stresses, Integral equations.

A linear viscoelastic solid is subjected to a given deformation history. A portion of the work done by the stresses during this deformation is converted into heat, while the remaining portion increases the internal energy (per unit volume) of the solid. A fraction of the increase in internal energy can be recovered by subjecting the solid to an appropriate future deformation. The paper is concerned with the question of maximizing the recoverable energy by means of an optimum future deformation. It is shown that the determination of the optimum deformation requires the solution of an integral equation of the Wiener-Hopf type. This equation is solved in the case where the relaxation modulus is given as a sum of exponential functions. The maximum recoverable internal energy is then expressed as a functional of second degree of the given deformation history. It is observed that the maximum recoverable energy provides a lower bound to the internal energy of the solid. It is hoped that use could be made of the concept of maximum recoverable energy in studies concerned with the thermodynamics of linear viscoelasticity. (Author)

AD-278 544 Div. 25
(TISTP/JW) OTS price $1.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
ASYMMETRIC RELAXATION AND COMPLIANCE MATRICES IN LINEAR VISCOELASTICITY,
by T. G. Rogers and A. C. Pipkin. July 62, 18p. illus. 13 refs. (Technical rept. C11-83)
(Contract Nonr-56210, Proj. NR-064-406)
Unclassified report

DESCRIPTORS: *Relaxation time, *Viscosity, *Elasticity, Linear systems, Thermodynamics, Asymmetric bodies.

The restrictions imposed on anisotropic viscoelastic compliance matrices by material symmetry are derived, without using the matrix symmetry demanded by thermodynamic theories. Experiments to test the thermodynamic theories can be based on the differences between the forms obtained with and without the assumption of matrix symmetry. Transverse isotropy and cubic symmetry are treated in detail. (Author)

AD-278 560 Div. 25, 17
(TISTM/REB) OTS price $2.25

General Electric Co., Schenectady, N. Y.
RESEARCH ON DISPERSION HARDENING.
Final rept., 15 May 59-15 Dec 61 on Solid State Research and Properties of Matter,
by V. A. Phillips, R. W. Guard, and J. D. Livingston. May 62, 80p. incl. illus. tables, 22 refs.
(Contract AF 33(616)6406, Proj. 7021)
(ARL 62-357) Unclassified report

DESCRIPTORS: *Dispersion hardening, Alloys, Nickel alloys, Aluminum alloys, Copper alloys, Cobalt alloys, Hardening, Oxidation, Aging, Test methods.

This report is an attempt to better understand the mechanism by which second-phase particles strengthen alloys. Hardening in age-hardened Ni-Al and Cu-Co alloys was found to be due to the precipitation of coherent ordered Ni_3Al, or Co particles, respectively. The main contrast effects expected from coherent spherical particles were consistent with those observed at Co particles. The shape and size of the Co particles agreed with earlier conclusions based on bulk magnetic measurements. Overaging in Cu-Co was partly due to loss of full coherency which is helped by deformation. Particles slightly decreased the spacing of fine slip lines in stretched samples. Dislocations apparently passed through the particles in Ni-Al. Dislocations commonly bowed out between particles indicating local pinning. Particles substantially increased the dislocation density produced by stretching. After 5% strain when the particle size was over

near three Air Force bases, highlighting considerations of the physical environment and the aircraft operations; (c) new data, with results from earlier studies are presented on the reactions of office workers to noise; (d) conclusions are stated regarding the applicability of various available means for predicting reaction to noise intrusion. Several adaptations of the TN 57-10 procedures are derived, to incorporate the preceived noisiness work and implications from the NORC results. This report discusses reactions to noise produced by aircraft in military operations. Although many of the concepts and relationships should have application to noise problems in civil aviation and industry, important differences may exist both in the noise stimulus and the attitude of people. (Author)

AD-278 645 Div. 25, 15
(TISTP/WH) OTS price $3.60

Firestone Flight Sciences Lab., Calif. Inst. of Tech., Pasadena.
ON THE EFFECT OF THICKNESS NEAR A SLENDER PERFORATION IN A FLAT PLATE: FORMULATION OF APPROXIMATE PROBLEMS.
Interim rept., Dec 60-Nov 61 on Mechanics of Flight,
by Jerold L. Swedlow. May 62, 26p. 13 refs.
(Contract AF 33(616)7806, Proj. 7063)
(ARL 62-355) Unclassified report

DESCRIPTORS: *Fracture (Mechanics), *Tensile properties, *Elasticity, *Differential equations, *Taylor's series, *Stresses.

The stresses induced by a perforation in an otherwise uniformly stressed plate of arbitrary finite thickness are analyzed. Two approximate methods for finding the stress field have been specialized to the case in which the perforation is a crack of finite length. The first method employs boundary layer analysis. It is argued that the significant portion of the boundary layer is solely at the crack tip so that, in effect, the interior extends all the way to the flank of the crack. In the remaining tip region, it appears that the stresses may be expanded in a power series of the square root of radial distance from the crack tip. The second method is based upon the complementary energy theorem. Provided that the boundary conditions remain tractable, the problem reduces to solution of a set of integral equations of a standard form. In principle, this method may also be applied to the case of an elliptical perforation, providing thickness corrections to the well-known planar analysis by C. E. Inglis. (Author)

AD-278 651 Div. 25
(TISTP/FR) OTS price $1.10

Space, Plasma and Radiation Lab., U. of Colorado, Boulder.
SOLAR ULTRAVIOLET RESEARCH.
Final rept., 1 Feb 60-31 Jan 62,
by William A. Rense. 31 Jan 62, 6p. incl. 6 refs.
(Contract AF 19(604)7215, Proj. 6688)
(AFCRL-62-408) Unclassified report

DESCRIPTORS: *Ultraviolet radiation, *Spectrographic cameras, Sun, Instrumentation, Spectrographic analysis, Rockets.

A rocket spectrograph (Instrument No. 12) was flown twice during the work period of the contract. In each case adverse rocket behavior prevented observations from being taken. Instrument No. 13, an echelle spectrograph, was completed only in the sense that a bread-board model was tested in visible light for resolution, echelle performance and scattered light properties. All optical components were ordered. A new type of rocket instrument, utilizing an interferometer and slitless optical make-up, was designed. No major basic laboratory research was performed. Some theoretical work on the effect of solar ultraviolet radiation on the earth's upper atmosphere was done. A solar ultraviolet atlas based on spectrograms obtained in 1957 was published and distributed to major observatories. (Author)

AD-278 658 Div. 25
(TISTP/FR) OTS price $3.60

Electro-Optical Systems, Inc., Pasadena, Calif.
THERMAL RADIATION GUIDES FOR POWER TRANSMISSION.
Quarterly technical progress rept. no. 1,
1 Apr-30 June 62,
by W. J. Swenson and D. H. McClelland.
15 July 62, 29p. incl. illus. (EOS rept. no. 3000-Q-1)
(Contract AF 33(657)8526, Proj. 8128)
Unclassified report

DESCRIPTORS: *Optical systems, *Curved mirrors, *Solar furnaces, Design, Vapor plating.

The form of radiation guide selected for analytical and experimental work is a cylindrical tube, the length of which is essentially the distance through which it is required to transmit the energy for the specific application. To minimize the reflection losses inherent in a uniform cylinder, the guide is provided with a parabolic entrance section. (This is called the guide paraboloid, to differentiate it from the main paraboloidal mirror.) The parabolic entrance will redirect incident radiation axially in the tube. The initial portion of the guide paraboloid section is modified to the form of a truncated cone, to account for rays from the mirror rim and the edges of solar arc. (Author)

AD-278 662 Div. 25, 22
(TISTP/WH) OTS price $5.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
PIC FORMULATION OF VISCO-PLASTIC MODEL FOR HYPERVELOCITY IMPACT.
Quarterly progress rept. no. 5, 3 Feb-22 May 62,
by T. D. Riney. July 62, 47p. incl. illus. tables, 7 refs.
(Contract AF 08(635)1713, Proj. 9860)
(APGC TDR 62-24) Unclassified report

DESCRIPTORS: *Hypervelocity projectiles, *Particles, *Impact shock, *Viscosity, *Plasticity, Digital computers, Programming, Difference equations, Axially symmetric flow.

The visco-plastic equations governing the axisymmetric impact situation are reformulated in a form appropriate to the particle-in-cell method of calculation. A step-by-step description of the computational procedure is presented which allows for such contingencies as free boundaries, interior empty cells and the axis of symmetry. A programmer may work directly from this report. (Author)

AD-278 683 Div. 25
(TISTP/FR) OTS price $6.60

Cornell U., Ithaca, N. Y.
PLASMA SHEATHS AND THEIR EFFECTS ON ANTENNAS,
by Stanton J. Peale. May 62, 63p. 15 refs.
(Rept. no. CRSR-116)
(Contract AF 49(638)915)
(AFOSR-2960) Unclassified report

ARCS AND THEIR REDUCTION BY TRANSPIRATION COOLING.
Interim technical rept. on Mechanics of Flight,
by Peter A. Schoeck, Ernest R. G. Eckert, and Steve A. Wutzke. Apr 62, 105p. incl. illus. tables, 11 refs.
(Contract AF 33(616)5528, Proj. 7063)
(ARL 62-341) Unclassified report

DESCRIPTORS: *Electric arcs, *Gas discharges, *Sweat cooling, Heat transfer, Anodes, Argon.

The nature of the energy transfer at the anode was investigated. The contribution of the various energy transfer phenomena (convective heat transfer, radiative heat transfer and energy transfer by electrons to the total energy flow into the anode surface) were determined. The flow field in the arc resulting from electromagnetic forces was investigated. The radial distribution of heat flux and current at the anode surface was measured for currents between 50 A and 150 at various electrode spacings. The reduction of energy losses to the anode was also investigated. For this purpose, a porous carbon plug of 0.5 in. diameter was used, through which argon was injected into the arc. It was found that by a suitable design of the anode holder the anode losses could be reduced to less than 20% of the total arc energy (compared with approximately 80% for water-cooled metal anodes). The dependence of arc voltage on gas injection rate through the anode surface was measured for a number of electrode spacings. (Author)

AD-278 589 Div. 25, 9
(TISTP/WH) OTS price $1.75

Vidya, Inc., Palo Alto, Calif.
HIGH TEMPERATURE THERMODYNAMIC PROPERTIES OF SELECTED GASES.
Interim technical rept. for 1 May 61-1 Mar 62 on Mechanics of Flight,
by Morton Rudin and Boris Ragent. May 62, 50p. incl. illus. tables, 43 refs.
(Contract AF 33(616)8338, Proj. 7063)
(ARL 62-358) Unclassified report

DESCRIPTORS: *Thermodynamics, *High temperature research, *Air, *Argon, *Helium, *Hydrogen, *Statistical analysis, *Bibliography.

Recent literature dealing with the high-temperature thermodynamic properties for air, N2, O2, A, and He, computed theoretically from statistical thermodyamics, is reviewed. The relationships and interrelationships of thermodynamic quantities and partition functions are discussed. After estimating the accuracy possible with the present 'state of the art,' the sources of discrepancy among the various papers are examined and accuracies relative to those possible under the state of the art are discussed. The individual character of each paper is reviewed in a chart containing information as to what data are available in the paper, the computing procedure used, and the expected accuracy. Recommendations regarding which tabulations are best or most useful for differing purposes in various temperature and pressure ranges are summarized in a table. (Author)

AD-278 598 Div. 25, 31
(TISTW/JRG) OTS price $4.60

Cambridge Acoustical Associates, Inc., Mass.
NOISE RADIATION FROM SUBMARINE HULLS. PART II. COMPARISON OF THEORETICAL RESULTS WITH MODEL TEST DATA MEASUREMENTS,
by K. Kleinschmidt, J. V. Rattayya, and A. Silbiger. Mar 62, 39p. incl. illus. tables, 8 refs. (Rept. no. U-134-64)
(Contract NObs-77143)
Unclassified report

DESCRIPTORS: *Submarine noise, *Submarine hulls, *Vibration, Acoustics, Model tests, Submarine models, Theory, Design, Instrumentation, Underwater sound, Measurement, Spheres, Bodies of revolution, Analysis, Noise, Mathematical analysis.

The design and instrumentation of a suitable model for investigating the vibration and sound radiation from a hull with a symmetrical foundation are described. The test results are explained, and in some respects successfully correlated with the predicted values. Natural frequencies in air and water of the ring stiffened cylindrical model are in good agreement with the theory. Driving point impedance phase measurements conform to theory. For reasons which are discussed in detail, correlation of theoretical and measured far field sound pressures, for a 1-lb shaking force applied to the foundation, is fair only, and not as good as for the full-scale data obtained earlier. Longitudinal vibrations of a spheroidal shell are also discussed. (Author)

AD-278 601 Div. 25
(TISTP/FR) OTS price $1.75

Armour Research Foundation, Chicago, Ill.
RESEARCH IN THE MEASUREMENTS AND THEORY OF PLASMOIDS AND THEIR APPLICATIONS TO MISSILES AND SATELLITE TECHNOLOGY.
Rept. for 1 June 58-15 Sep 61,
by Lawrence C. Scholz. July 62, 60p. incl. illus. tables, 34 refs.
(Contract AF 33(616)5791, Proj. 7073)
(ARL 62-374) Unclassified report

DESCRIPTORS: *Plasma jets, Electric arcs, Electrodes, Magnetic fields, Plasma physics.

High-speed metal spark-derived plasmoids have been produced in a magnetic field under high vacuum conditions (10 to the -6th torr). The velocity and other properties of these plasmoids have been measured under a variety of conditions. Interaction of the plasmoids with obstacles, the magnetic field and other plasmoids has also been investigated. The work presented is mainly experimental, although a theoretical program was also carried out. Electrode processes were investigated and a concept of a best material is discussed. However, this is a tentative conclusion and further work is needed. Special equipment developed during the program is discussed. This includes capacitor discharge circuits and a high speed camera with an image convertor tube as an electronic shutter. (Author)

AD-278 622 Div. 25, 16, 1
(TISTB/CCH) OTS price $3.00

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
REACTION TO AIRCRAFT NOISE.
Final rept. on Human Response to Vibratory Energy,
by Welden Clark. Nov 61, 138p. incl. illus. tables, 24 refs.
(Contract AF 33(616)5629, Proj. 7210)
(ASD TR 61-610) Unclassified report

DESCRIPTORS: *Noise, *Public opinion, Psychology, Sociology, Attitudes, Aircraft, Physiology.

The reaction to aircraft noise of people in communities near air bases and in air base offices is described. Four kinds of material are offered: (a) several earlier procedures, studies, and data collections are summarized; (b) additional analysis is presented of results from the concurrent sociopsychological interview studies (by the National Opinion Research Center) and noise environment studies (by this contractor) in areas

(Contract AF 33(616)6041, Proj. 7353)
(WADD TR 60-869, pt. 2) Unclassified report

DESCRIPTORS: *Zinc alloys, *Cylindrical bodies, *Fracture (Mechanics), Alloys, Metals, Stresses, Shear stresses, Deformation, Hardening, Failure (Mechanics), Theory, Mathematical analysis, Plasticity, Mechanics, Mechanical properties.

Experimental observations of initial yielding, strain hardening, and fracture of Zamak-3 tubes for various states of combined stress are presented. Testing temperatures of 32 and 78 F were employed. These observations are compared with predictions of R. von Mises (Keitschrift fur Angew. Math. und Mech., 8:161-185, 1928) Tresca, and maximum reduced stress theories of initial yielding and with isotropic and kinematic theories of strain-hardening. Fracture data are compared with the Griffith theory of rupture for brittle materials. It is concluded that Zamak-3 behaves as an essentially isotropic material in which yielding is independent of mean stress. Multiple loading path test results agree rather well with the predictions of kinematic hardening theory in conjunction with the Tresca yield criterion. Fracture results conform to a maximum normal stress theory which coincides with the Griffith theory for the stress combinations investigated. (Author)

AD-278 747 Div. 25, 7, 1, 31
(TISTE/CRJ) OTS price $.75

Navy Electronics Lab., San Diego, Calif.
A COLOR CONVERSION TECHNIQUE FOR ELECTROLUMINESCENT LIGHT.
Rept. for period ending Nov 60,
by R. B. Nehrich, Jr. and R. K. Logan.
6 July 62, 24p. incl. illus. tables, 10 refs.
(NEL rept. no. 1121)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Indicator lights, *Display systems, *Colors, Luminescence, Reliability, Maintenance, Shipborne, Light, Spectrographic analysis, Optical filters, Fluorescence, Airborne, Lighting equipment.

Efforts were made to develop electroluminescent (EL) lighting for the improvement of reliability and maintainability of systems and instrumentation requiring illuminated indicators, readouts, or displays. Simple and inexpensive color conversion filters were developed whereby a basic green or blue light can be readily converted to practically any desired color. This technique is capable of producing yellow, orange, or red light, of various shades, that maintains a relatively high level of brightness. It is accomplished at low voltage and frequency, and makes EL illumination acceptable for instrument panels or other applications where blue or green light would be objectionable. (Author)

AD-278 809 Div. 25
(TISTP/WH) OTS price $4.60

Firestone Flight Sciences Lab., Calif. Inst. of Tech., Pasadena.
STUDIES OF VISCOELASTIC MEDIA.
Interim rept., 1 June-31 Dec 61 on Mechanics of Flight,
by M. L. Williams and R. A. Schapery. June 62, 38p. incl. illus. 15 refs.
(Contract AF 33(616)8399, Proj. 7063)
(ARL 62-366) Unclassified report

DESCRIPTORS: *Viscosity, *Elasticity, *Stresses, Rubber, Photoelasticity, Mathematical analysis, Urethanes.

New practical methods of viscoelastic stress analysis and mechanical model fitting are summarized. Stresses and displacements in configurations relating to the biaxial sheet and triaxial poker-chip tests are calculated approximately using the Minimum Potential Energy Principle. The triaxial tensile test of a thin disk of rubber is described, and results from preliminary tests of transparent polyurethane are reported. It was found that both the character of the fracture and the strength of the rubber are sensitive to the diameter-to-thickness ratio and curing time. Photoelastic pictures of internal cracks are shown. (Author)

AD-278 811 Div. 25
(TISTP/WH) OTS price $8.10

Cornell U., Ithaca, N. Y.
SPURIOUS SPECTRAL EFFECTS AND ALIGNMENT PROCEDURES IN X-RAY SPECTROMETRY,
by Herbert W. Schnopper. 15 Apr 62, 82p. incl. illus. 20 refs. (Research rept. no. 13)
(Contract AF 49(638)402)
(AFOSR-2418) Unclassified report

DESCRIPTORS: *X-ray spectroscopy, *Calibration, *X-ray generators, Calcite, Crystals.

The spurious spectral effects of (1) vertical divergence and (2) improper spectrometer alignment (crystals and x-ray beam) are discussed. The distortions produced in such spectral features as Bragg angle, line shape, width and asymmetry are illustrated both theoretically and experimentally. A new method is described for aligning the crystals, which makes use of the non-dispersive (1,-1) position, and which is independent of vertical divergence. Significant new conclusions of this study are (1) the crystal alignment and the beam alignment must be treated separately and with equal care, and (2) perfect crystal alignment cannot be conveniently achieved in the presence of vertical divergence. Quantitative discussion is given of the spectral distortions which arise from vertical divergence even for perfect alignment of the crystals and of the x-ray beam. (Author)

AD-278 829 Div. 25, 4, 17
(TISTM/EJH) OTS price $.50

Brussels U. (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH TEMPERATURES ON THE EXISTENCE OF GASEOUS SULPHIDES OF THE TRANSITION ELEMENTS.
Rept. for Apr 61-Apr 62 on Refractory Inorganic Non-Metallic Materials,
by R. Colin, P. Goldfinger, and M. Jeunehomme.
May 62, 5p. 12 refs.
(Contract AF 61(052)225, Proj. 7350)
(WADD TR 60-782, pt. 4)
Unclassified report

DESCRIPTORS: *Transition elements, *Manganese compounds, *Sulfides, *Dissociation, *Vaporization, Thermodynamics, Thermochemistry, Mass spectroscopy, Solids, Vapors, Theory, Refractory materials.

Thermodynamic considerations permit us to predict the mode of vaporization of transition element sulphides. MnS is the only clear case where the gaseous sulphide molecule has an appreciable concentration in the saturated vapor. This is confirmed by a mass spectrometric investigation which gave the measurement dissociation energy (MnS) = 65 ± 5 Kcal/mole. (Author)

DESCRIPTORS: *Plasma physics, *Gas ionization, Antennas, Wire, Ions, Electrons, Protons, Photoelectrons.

It is shown that the lack of conservation of particles does not allow the establishment of Maxwell density distribution for either electrons or ions in a plasma sheath. However, it is seen that even in this steady state case the electrons assume a distribution that is almost Maxwellian. Thus, in situations where a finite body is moving at a velocity comparable to ion thermal velocities, the ion density will be approximately constant and equal to that in the undisturbed plasma, while the electrons can be approximated by a Maxwell density distribution with only a small error. (Author)

AD-278 686 Div. 25
(TISTP/WH) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
ESTIMATION OF DOPPLER SHIFT AND SPECTRAL WIDTH OF A RANDOM PROCESS,
by Morris J. Levin. 12 June 62, 16p. 10 refs.
(Rept. no. 34G-6)
(Contract AF 19(604)7400)
(AFESD TDR 62-102) Unclassified report

DESCRIPTORS: *Doppler systems, *Statistical distributions, *Fourier analysis, Radio astronomy, Spectrographic data, Spectrographic analysis.

The estimation of the Doppler shift, frequency scale factor and amplitude of the spectrum of a stationary Gaussian random process from a record of limited duration is considered. With the approximation that the coefficients of the Fourier series expansion of a realization of long time duration are independent, maximum likelihood estimates are derived and the Cramer-Rao lower bounds to the variances are evaluated. (Author)

AD-278 736 Div. 25, 30
(TISTW/DLW) OTS price $1.60

Williamson Development Co., Inc., West Concord, Mass.
STUDIES AND INSTRUMENTATION RELATING TO THE MEASUREMENT OF INFRARED BAND INTENSITIES.
Final rept.,
by Ivan A. Nichols, Wallace MacDonald, and Robert E. S. Arndt. 31 July 62, 14p. incl. illus. 3 refs.
(Contract AF 19(604)4136, Projs. 7670 and 6692)
(AFCRL 62-811) Unclassified report

DESCRIPTORS: *Infrared spectroscopy, *Infrared spectrophotometers, *Infrared radiation, Measurement, Instrumentation, Gases, Recording devices, Calibration, Integrators, Test methods, Intensity.

A summary is presented of the paper ''Optically Calibrated Infrared High Pressure Cell.'' The paper describes the design, construction, and optical calibration of a short pathlength, wide aperture optical cell which can be operated from vacuum to 1000 psi. A summary is also presented of the paper ''Direct Recording of Integrated Band Intensities from a Linear Wavelength Spectrometer.'' The paper describes instrumentation which allows conversion of transmittance versus wavelength data to optical density versus wavenumber with subsequent integration of the area under the curve. A description is given of a combined glass-metal system which was used for the purification and high pressure generation of gas samples. (Author)

AD-278 738 Div. 25, 15
(TISTP/JW) OTS price $3.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE ELASTODYNAMICS OF MOVING LOADS. PART II. THE STRESS AND VELOCITY FIELD OF AN ENERGY SOURCE MOVING IN AN ELASTIC SOLID WITH A FREE SURFACE AT CONSTANT VELOCITY,
by Michael Papadopoulos. May 62, 30p. 5 refs.
(MRC Technical summary rept. no. 311)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Elasticity, *Solids, *Stresses, Partial differential equations, Loading, Load distribution, Supersonics, Velocity, Surfaces, Vibration, Shear stresses.

The determination of the dynamic fields associated with the setting-up of so-called strain nucleii in an isotropic elastic solid is discussed. Particular emphasis is placed on representation in the form of integral superpositions of singular plane waves. The singularities which are of most interest are associated with the application of a constant point force which is moving at constant velocity, or with the presence of a steadily moving point which can be regarded as creating volume flux at a constant finite rate. The calculations give the dynamic field within an infinite solid in a general form which is valid for any constant velocity of the energy source, and since the expressions found are given in plane wave form, more complicated problems of elastodynamics which involve plane boundaries are particularly easy to investigate. The particular case of an infinite solid with a free plane surface is considered. The cases of a buried moving source and a surface moving source is examined. The formulae for dilatation and for shear potential are established. (Author)

AD-278 744 Div. 25, 15
(TISTP/JW) OTS price $5.60

Mathematics Research Center, U. of Wisconsin, Madison.
A BOUNDARY LAYER THEORY FOR UNSYMMETRIC DEFORMATIONS OF CIRCULAR CYLINDRICAL ELASTIC SHELLS,
by M. W. Johnson, Jr. May 62, 54p. 24 refs.
(MRC Technical summary rept. no. 318)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Boundary layer, *Differential equations, Cylindrical bodies, Deformation, Surfaces, Spheres, Elasticity, Distortion, Stresses.

The problem discussed is that of establishing two dimensional systems of differential equations for stresses and displacements of thin elastic shells from the known equations of linear three-dimensional elasticity. The method used is that of dimensional analysis together with expansion in powers of a dimensionless parameter of the solution of the equations of the three-dimensional theory for the semi-infinite cylindrical shell under self-equilibrating end loading. It is used to study unsymmetric deformations. (Author)

AD-278 746 Div. 25, 17
(TISTM/TCG) OTS price $1.25

Michigan U., Ann Arbor.
EFFECT OF STATE OF STRESS ON THE FAILURE OF METALS AT VARIOUS TEMPERATURES.
Final rept., 1 Jan 61-31 Jan 62 on Solid State Research and Properties of Matter,
by R. M. Haythornthwaite and D. R. Jenkins.
June 62, 45p. incl. illus. 14 refs.

26. PRODUCTION AND MANAGEMENT

AD-278 471 Div. 26
(TISTB/MS) OTS price $3.60

RAND Corp., Santa Monica, Calif.
STATISTICAL MANAGEMENT OF INVENTORY,
by A. S. Cahn and H. M. Wagner. June 62, 32p. incl. illus. 13 refs. (Memo. no. RM-3023-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Management engineering, *Decision making, *Statistical analysis, Control systems, Probability, Supplies, Theory, Control.

This Memorandum discusses the use of statistical aggregates to improve inventory management, and methods to evaluate control schemes based on their use. To examine a control system, six stages of analysis are useful: (1) deciding what operations warrant control; (2) ascertaining what actions are available to constrain operating decisions; (3) deciding to whom control responsibilities shall be delegated; (4) evaluating the economic worth of the control system objectives, including the cost of making mistakes during the process of controlling; (5) examining the operating characteristics of the control system; and (6) synthesizing previous information for economic evaluation of the entire control system. The framework for the analysis is 'statistical decision theory.' The Memorandum presents an illustrative example which is complex enough to demonstrate the points involved. (Author)

AD-278 634 Div. 26, 17
(TISTM/EJH) OTS price $4.60

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
MOLYBDENUM ALLOY EXTRUSION DEVELOPMENT PROGRAM.
Interim technical engineering rept. no. 6, 15 Feb-1 June 62.
July 62, 13p. illus. tables, 2 refs.
(Contract AF 33(600)40861, Proj. 7-785)
(ASD TR 7-785) Unclassified report

DESCRIPTORS: *Molybdenum alloys, *Extrusion, *Dies, Titanium alloys, Zirconium alloys, Carbides, Surface properties, Microstructure, Lubrication, Design, Ceramic coatings, Zirconium compounds, Oxides.

Five full length T shape extrusions of TZM were made from 3200F billet heating temperature with a reduction ratio of about 19:1. Liner pressure in excess of 200,000 psi was required to accomplish these extrusions. One full length extrusion was within size requirements. Surface quality was fair with some localized glass or die coating rub-in and striations. Corner and fillet radii showed little change from front to back. (Author)

AD-278 660 Div. 26, 14
(TISTM/TCG) OTS price $4.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
THEORY AND DESIGN DATA FOR CONTINUOUS FILM, SELF-ACTING JOURNAL BEARINGS OF FINITE LENGTH.
Interim rept.,
by Harold G. Elrod, Jr. and Stanley B. Malanoski.
June 62, 48p. incl. illus. tables, 12 refs.
(Rept. no. I-A2049-17; Supplement to rept. no. I-A2049-13, AD-248 483)
(Contract Nonr-234200, Proj. NR 061-113)
Unclassified report

DESCRIPTORS: *Journal bearings, *Gas bearings, *Lubrication, Design, Theory, Mathematical analysis, Lubricants, Liquids, Vapors, Gases, Films.

Charts are presented for the design of complete film, self-acting journal bearings, operating under steady state conditions, and using either liquids, vapors or gases. The application of the charts is illustrated by several examples. These charts represent the load coefficient in a normalized fashion so as to retain accuracy over all ranges of ratio of characteristic length of bearing surface in z direction/diameter of bearing, bearing number, and eccentricity ratio. Curves for the attitude angle are included. Performance relations for this type of bearing are summarized in appendix. In order to complete the design charts, two new analyses for the limiting cases of the short bearing and the heavily loaded bearing were developed. (Author)

AD-278 666 Div. 26, 17
(TISTM/TCG) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
HIGH ENERGY IMPACT FORMING PROGRAM. PROTOTYPE MACHINE PRELIMINARY DESIGN AND SPECIFICATIONS.
Phase 3 rept., 9 Jan-31 July 62,
by Robert A. Kaser. 31 July 62, 18p. incl. illus.
(Contract AF 33(600)43035)
(ASD TR 7-848, vol. 3) Unclassified report

DESCRIPTORS: *Metal forming presses, *Explosive forming, *Design, *Specifications, Rubber, Hydraulic presses, Pneumatic systems, Pressure, Impact shock, Metals, Sheets, Processing, Manufacturing methods, Control panels, Industrial equipment.

The preliminary design of the prototype high energy rate rubber pad sheet metal forming machine was prepared using the contractual specifications, knowledge gained in the prototype design parameters study program, as well as information obtained from the personnel who will use the machine in the evaluation phase of the program. Specifications written for the machine comprise the major portion of the report. The machine installation will consist of four units: the machine, hydraulic power unit, control console, and air compressor unit. The machine will have a maximum energy of 2,400,000-in. lb, a maximum impact velocity of 825 in./sec, a cycle time of 15 sec, a maximum stroke of 18 in., and will use a rubber forming pad 24 in. in diameter and 23 in. thick. The power unit will have a 100-hp motor, 100-gal reservoir, and will be rated at 78 gallons per minute at 2000 psi. The air compressor unit will have a 3-hp motor, maximum pressure will be 2000 psi with a 6-cu ft reservoir. (Author)

AD-278 693 Div. 26, 15
(TISTP/GRW) OTS price $7.60

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
APPLICATION OF STOCHASTIC APPROXIMATION METHODS TO SYSTEM OPTIMIZATION,
by David J. Sakrison. 10 July 62, 74p. incl. illus. tables, 13 refs. (Technical rept. no. 391)
(Contract DA 36-039-sc-78108, Proj. 3-99-00-000)
Unclassified report

DESCRIPTORS: *Operations research, *Statistical processes, Sequential analysis, Quality control, Computers.

AD-278 830 Div. 25, 4, 17
(TISTM/EJH) OTS price $1.00

Brussels U. (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH TEMPERATURES. PART IX. CORRELATION OF DISSOCIATION ENERGIES OF GASEOUS MOLECULES AND OF HEATS OF VAPORIZATION OF SOLIDS; HOMONUCLEAR DIATOMIC MOLECULES.
Rept. for Apr 61-Apr 62 on Refractory Inorganic Non-Metallic Materials,
by G. Verhaegen, F. E. Stafford and others.
May 62, 33p. incl. illus. tables, 41 refs.
(Contract AF 61(052)225, Proj. 7350)
(WADD TR 60-782, pt. 9)
Unclassified report

DESCRIPTORS: *Transition elements, *Dissociation, *Vaporization, *Metals, Molecules, Atoms, Thermochemistry, Thermodynamics, Atomic energy levels, Electron transitions, Solids, High temperature research, Refractory materials.

Homonuclear diatomic molecules are classified according to the ratio alpha = (heat of vaporization of an atom/dissociation energy of the diatomic molecule). For transition elements the heat of vaporization of an atom can be represented by A-B(E), where E is the excitation energy of the free atom to a set of electronic levels; A and B are empirical parameters. Experimental conditions for observing unknown homonuclear diatomic molecules of transition elements are estimated for alpha = 2 and 5, using a calculated self-consistent set of free energy functions. (Author)

further develop hypothesis and theories concerning pattern recognition in general; (2) to organize relevant experimental data within the theoretical frameworks; (3) to examine the relation of military problems involving pattern recognition to the theoretical frameworks and to the organized facts as a basis for setting design criteria for military man-machine pattern recognition systems; and (4) to formulate tests and experiments to further understanding of human pattern recognition and the application of human processing principles to military systems. (Author)

AD-278 600 Div. 28, 30, 23
(TISTB/MS) OTS price $10.10

Human Resources Research Office, George Washington U., Washington, D. C.
WORK PROGRAM FOR FISCAL YEAR 1963. RESEARCH AND DEVELOPMENT IN TRAINING METHODS, MOTIVATION, LEADERSHIP, AND MAN-WEAPONS SYSTEM ANALYSIS.
30 June 62, 110p.
Unclassified report

DESCRIPTORS: *Scientific research, *Military training, *Research program administration, Leadership, Combat, Military personnel, Human engineering, Job analysis, Training devices, Decision making, Military operations, Scheduling, Training, Effectiveness.

AD-278 613 Div. 28, 23
(TISTB/SJR) OTS price $1.00

Aviation Psychology Lab., U. of Illinois, Urbana.
TRANSFER OF TRAINING WITH SIMULATED AIRCRAFT DYNAMICS: II. VARIATIONS IN CONTROL GAIN AND PHUGOID CHARACTERISTICS.
Report on Human Factors in the Design of Operator Trainers,
by F. A. Muckler, R. W. Obermayer and others.
Dec 61, 27p. incl. illus. tables, 12 refs.
(Contract AF 33(616)2725, Proj. 7197)
(WADD TR 60-615, vol. 2) Unclassified report

DESCRIPTORS: *Transfer of training, Flight simulators, Military training, Effectiveness, Measurement, Airplanes, Simulation.

Transfer of training was studied as a function of simulated aircraft longitudinal dynamics. Subjects performed single dimension compensatory tracking with long period (phugoid) oscillatory control system dynamics. Three experiments are reported dealing with variations in control gain. Increasing control gain resulted in equally high training and transfer performance for all oscillatory transient conditions studied, but at a lower gain level, significant differences were found. If rate of onset of the transient conditions were not equated by adjusting control gain, significant negative relative transfer of training was elicited. Equalization of rate of onset, however, substantially reduced training performance differences and eliminated negative transfer effects. (Author)

AD-278 623 Div. 28, 23
(TISTB/SJR) OTS price $.75

Aviation Psychology Lab., U. of Illinois, Urbana.
TRANSFER OF TRAINING WITH SIMULATED AIRCRAFT DYNAMICS: III. VARIATIONS IN COURSE COMPLEXITY AND AMPLITUDE.
Report on Human Factors in the Design of Operator Trainers,
by F. A. Muckler, R. W. Obermayer and others.
Dec 61, 17p. incl. illus. tables, 15 refs.
(Contract AF 33(616)2725, Proj. 7197)
(WADD TR 60-615, vol. 3) Unclassified report

DESCRIPTORS: *Transfer of training, Flight simulators, Military training, Effectiveness, Measurement, Airplanes, Simulation.

Transfer of training was studied as a function of simulated aircraft longitudinal dynamics. Subjects performed single dimension compensatory tracking with long period (phugoid) oscillatory control system dynamics. Two experiments are reported dealing with changes in course complexity and amplitude of the experimental stimulus forcing function. Increasing course complexity substantially affected transfer of training, but not training performance. Increasing course amplitude affected training performance, but not transfer of training. In general, transfer effects were greater from less difficult to more difficult task conditions. These results are superficially inconsistent with previously reported studies. However, many of the phenomena are directly attributable to the presence of complex system dynamics which were absent in prior studies. (Author)

AD-278 627 Div. 28, 23
(TISTB/SJR) OTS price $1.50

Aviation Psychology Lab., U. of Illinois, Urbana.
TRANSFER OF TRAINING WITH SIMULATED AIRCRAFT DYNAMICS: I. VARIATIONS IN PERIOD AND DAMPING OF THE PHUGOID RESPONSE.
Report on Human Factors in the Design of Operator Trainers,
by F. A. Muckler, R. W. Obermayer and others.
Dec 61, 44p. incl. illus. tables, 25 refs.
(Contract AF 33(616)2725, Proj. 7197)
(WADD TR 60-615, Vol. 1) Unclassified report

DESCRIPTORS: *Transfer of training, Flight simulators, Military training, Effectiveness, Measurement, Airplanes, Simulation.

Transfer of training skill as a function of variations was investigated in simulated aircraft longitudinal dynamics. The research is pertinent to the question of how accurately the aerospacecraft simulator must represent the dynamic flight responses of the aerospacecraft to assure optimum transfer of training. During the training trials, tracking performance was poorer the longer the period of the phugoid response. For the slowest period (71 seconds), tracking performance was often below that which could have been obtained with no movement of the operator's control. Wide variations in damping had no differential effect on tracking performance. Pilots and non-pilots did not differ in tracking performance during the training trials. Performance on the transfer trials was considerably influenced by the relationship between the period of the phugoid response in the training task and the period of the phugoid response in the transfer task. When the period of the phugoid response during training was shorter or longer than that for the transfer task, performance was inferior to when it was the same. Variations in damping did not differentially influence transfer of training. (Author)

AD-278 669 Div. 28
(TISTB/MS) OTS price $1.60

Illinois U., Urbana.
STABILITY OF AIRMAN CLASSIFICATION TEST SCORES,
by Lloyd G. Humphreys. Mar 62, 7p. incl. tables, 3 refs.
(Contract AF 41(657)279, Proj. 7717)
(PRL TDR 62-3) Unclassified report

DESCRIPTORS: *Aptitude tests, Classification, Selection, Air Force, Reliability.

AD-278 721 Div. 26, 15
(TISTP/GRW) OTS price $2.60

Applied Mathematics and Statistics Labs., Stanford U., Calif.
A COMPARISON OF QUEUE DISCIPLINES WHEN SERVICE ORIENTATION TIMES OCCUR,
by D. P. Gaver, Jr. 5 July 62, 24p. incl. illus. tables, 12 refs. (Technical rept. no. 79)
(Contract Nonr-22552, Proj. NR 342-002)
Unclassified report

DESCRIPTORS: *Probability, *Operations research, Scheduling, Industrial research.

Situations in which customers belonging to two (or more) different classes vie for service at a single facility can be identified in various fields of application. It is the purpose of this analysis to exhibit some simple models describing the operating characteristics of such disciplines. (Author)

AD-278 821 Div. 26
(TISTM/AW) OTS price $2.60

Haynes Stellite Co., Kokomo, Ind.
DEVELOPMENT OF PROCESSING METHODS FOR COLUMBIUM ALLOY SHEET.
Interim rept. no. 1 for period ending 1 July 62,
by M. Schussler and J. G. Bewley. 1 July 62, 25p. incl. illus. tables.
(Contract AF 33(657)7210)
Unclassified report

DESCRIPTORS: *Niobium alloys, Processing, Sheets, Tests, Castings, Tensile properties, Temperature, Hardness, Grains (Metallurgy).

Progress to date on sheet production and evaluation on Contract AF 33(657)7210 is summarized. The total of 28 sheets of columbium base alloy, each 18-inches by 30-inches and in three gages (0.012, 0.018, and 0.030-inches), required under the contract were produced. The fabrication of the sheets and the portion of the evaluation program completed to date on properties of the resultant alloy, HAYNES alloy No. Cb-752, are covered. (Author)

27. PROPULSION SYSTEMS

AD-278 535 Div. 27
(TISTA/GEC) OTS price $9.60

Hiller Aircraft Corp., Palo Alto, Calif.
ANNULAR NOZZLE EJECTOR.
Summary rept. on Phase III Program,
by M. F. Gates and J. W. Fairbanks. Dec 61, 118p. incl. illus. tables, refs. (Rept. no. ARD-300)
(Contract Nonr-284000)
Unclassified report

DESCRIPTORS: *Exhaust gas ejectors, *Turbojet exhaust nozzles, *Thrust augmentor nozzles, Exhaust nozzles, Ground effect, Tests, Thrust, Geometry, Design, Configuration, Model tests, Pressure, Jet engines, Guide vanes.

A study was made of the annular ejector to determine a configuration that accomplishes the following: equals or improves out of ground effect performance; gives superior performance in ground effect; and overcomes the performance loss during ground effect transition. An investigation was made of the combined possibilities of a conically divergent annular primary jet, wide angle augmenter tube, and flow control vanes. The particular primary nozzle geometry chosen (jet aspect ratio, jet divergence angle and area ratio) did not combine effectively with wide angle augmenters to achieve an ejector with out of ground effect performance superior. The investigation also included the use of vanes at the bellmouth and augmenter inlets and at the augmenter exit. Proper use of the vanes reduced the augmentation loss in ground effect transition to approximately 1/3 the loss without vanes. Full-scale ejector tests indicated that bellmouth losses chargeable to lip separation could be eliminated by a flat lip extension. (Author)

AD-278 805 Div. 27, 12, 26
(TISTA/SEB) OTS price $2.60

Aerojet-General Corp., Downey, Calif.
EXPLOSIVE FORMING OF CLOSURES FOR LARGE SOLID PROPELLANT MOTOR CASES.
Quarterly progress rept. no. 1, 17 May-17 July 62,
by A. W. Hall and I. Lieberman. 25 July 62, 22p. incl. illus. tables (Rept. no. 0665-01(01)QP)
(Contract AF 04(611)8395)
Unclassified report

DESCRIPTORS: *Rocket cases, Solid rocket propellants, Rocket closure cups, Manufacturing methods, Dies, Stresses, Configuration, Explosive forming.

The object of this program is to establish the explosive parameters and develop the techniques required to produce 120-inch diameter closures suitable for use in large solid propellant motor cases by means of explosive forming. Primary emphasis is placed on the use of free-forming dies with closure configuration being maintained by the shape and orientation of the explosive charge. The potentials of utilizing the ice die approach for sizing the free-formed part or forming from a flat blank will be explored where free-forming results indicate the need. Initial efforts which have been expended for material procurement, die fabrication and subscale testing with the free-forming die are described. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-278 540 Div. 28
(TISTB/MS) OTS price $9.10

Bolt, Beranek and Newman, Inc., Cambridge, Mass.
HUMAN PATTERN RECOGNITION PROCEDURES AS RELATED TO MILITARY RECOGNITION PROBLEMS.
Final rept.,
by A. Z. Weisz, J. C. R. Licklider and others. 15 June 62, 91p. incl. illus. 71 refs. (Rept. no. 939)
(Contract AF 19(604)6632, Proj. 4691)
(AFCRL 62-387) Unclassified report

DESCRIPTORS: *Perception, Identification, Classification, Target recognition, Data processing systems, Decision making, Military requirements, Human engineering.

Efforts were concerned with the following objectives: (1) to collocate, interrelate, and

30. RESEARCH AND RESEARCH EQUIPMENT

AD-278 414 Div. 30
(TISTP/FR) OTS price $4.60

Coordinated Science Lab., U. of Illinois, Urbana.
(No title).
Progress rept. for Mar-May 62.
May 62, 38p. incl. illus. refs.
(Contract DA 36-039-sc-85122)
Unclassified report

DESCRIPTORS: *Scientific research, Gyroscopes, Vacuum systems, Iron, Ruby, Diffusion, Mass spectrometers, Electrodes, Digital computers, Computer logic, Programming, Delay lines, Shock waves, Ionization gages.

AD-278 455 Div. 30
(TISTW/RD) OTS price $1.60

Naval Ordnance Lab., White Oak, Md.
THE DATA RECORDER-REPRODUCER - A TIME-INTERVAL MEASURING INSTRUMENT USED IN THE BALLISTICS FACILITIES OF THE NAVAL ORDNANCE LABORATORY,
by Robert C. Folz and John W. Roberts.
16 June 61, 4p. illus. (Ballistics research rept. no. 34)
(NAVWEPS rept. no. 7307)
Unclassified report

DESCRIPTORS: *Time interval counters, Recording devices, Recording systems, Test facilities, Ballistics.

The data recorder-reproducer in use at the Naval Ordnance Laboratory, White Oak, Silver Spring, Maryland, is described. The data recorder-reproducer is an instrument capable of measuring 999 time intervals with a precision of ± 0.1 microsecond for a period of 0.1 second. It will also measure 999 time intervals with a precision of ± 1.0 microsecond for a period of either 1.0 second or 10.0 seconds. (Author)

AD-278 586 Div. 30, 8
(TISTW/DLW) OTS price $3.60

Radiation, Inc., Palo Alto, Calif.
SUPER-POWER KLYSTRON TUBE-TEST FACILITY.
Quarterly rept. no. 6, 1 Jan-31 Mar 62,
by Roby L. Blessing. 31 Mar 62, 21p. illus.
(Rept. no. G-108-Q6)
(Subcontract to Varian Associates, Palo Alto, Calif.)
Unclassified report

DESCRIPTORS: *Klystrons, *Test facilities, *Modulator tubes, *Triodes, Test equipment, Tests, Installation, Radiofrequency power, Power supplies, Test methods, Electron tubes.

AD-278 638 Div. 30, 8
(TISTW/DLW) OTS price $9.10

Aerojet-General Corp., Azusa, Calif.
BUILDING BLOCK STUDY.
Quarterly progress rept. no. 4, 15 Oct 60-31 Mar 62,
by B. W. Vinton. 31 Mar 62, 110p. incl. illus. tables (Rept. no. 0447-01-4)
(Contract DA 36-039-sc-85159, Proj. 3G89-01-001-01)
Unclassified report

DESCRIPTORS: *Test sets, *Maintenance, Test equipment, Maintenance equipment, Automatic, Electronic equipment, Military equipment, Test methods, Programming, Data processing systems.

Investigations are concerned with the requirements and the formulation of concepts for the design of an integrated system of modular test equipment to provide a capability for automatic field maintenance testing in the field army. Data-taking system, data results, frequencies, parameters of basic modules, semiautomatic and automatic testing, and module use on specific equipments are discussed. IBM printout summary sheets and frequency data sheets are included. (Author)

AD-278 643 Div. 30
(TISTM/AW) OTS price $4.60

Barogenics, Inc., New York.
INVESTIGATION OF MASSIVE SUPPORT PRINCIPLE FOR ULTRA HIGH PRESSURE ANVILS.
Final rept.,
by George Gerard. June 62, 44p. incl. illus. tables, 10 refs.
(Contract AF 19(604)7438, Proj. 5621)
(AFCRL 62-528) Unclassified report

DESCRIPTORS: *High pressure research, Wedges, Shear stresses, Laboratory equipment, Configuration, Photoelasticity, Distribution, Tungsten compounds, Materials, Carbides.

Efforts were made to obtain a basic understanding of the Bridgman massive support principle for more intelligent selection of materials and configurations for anvils of ultra high pressure apparatus and for increased anvil life and the attainment of higher pressures than currently possible. The first phase concerns opposed conical anvils of the Bridgman type utilizing a broad range of cone angles from 5 through 75 degrees. The elastic stress distribution was investigated analytically and by use of the three dimensional photoelastic stress analysis techniques. The results obtained indicated the magnitude and locations of the highly stressed regions. Tungsten carbide anvils of a variety of cobalt binder contents were investigated. The tetrahedral anvil configuration was investigated by means of elastic stress analysis and strength tests. The stress distribution in tetrahedral anvils bearing upon a simulated pyrophyllite workpiece was investigated. The results of the photoelastic investigation indicate that conditions in the vicinity of the loaded anvil faces approach a hydrostatic stress field. (Author)

AD-278 680 Div. 30, 28, 1
(TISTA/VGW) OTS price $1.10

Lear, Inc., Grand Rapids, Mich.
ZERO-GRAVITY PARABOLA TECHNIQUES.
Dept. on Human Performance in Advanced Systems,
by Robert Weiss. 1962, 9p. incl. illus. 5 refs.
(Contract AF 33(657)7199)
Unclassified report

Reprint of a paper presented at the 6th National Convention on Military Electronics, June 26, 1962, Washington, D. C.

DESCRIPTORS: *Weightlessness, *Human engineering, Gravity, Flight instruments, Accelerometers, Control panels, Display systems, Flight paths, Acceleration, Pilots, Acceleration tolerance, Analog systems, Simulation, Transport planes, Instrumentation, Design, Effectiveness, Space flight.

Stability of Air Force test scores were examined as one facet of the long-range prediction problem. Data for high school students were obtained on Air Force classification tests from an original test session at midyear of 1958-59 and a retest session one year later. Control groups were formed from students at three class levels tested only once. Mean growth in aptitude test scores between control class groups was of the same magnitude as the retest gains except for two of the airman tests, Figure Recognition and Clerical Matching. Conversions of Air Force aptitude indexes to World War II AGCT scores show that Mechanical Index scores averaged greater gains from year to year than AGCT, while the Administrative Index showed lower gains than AGCT. Stability coefficients for the individual tests were lower than their reliabilities, but the only appreciable differences were for Biographical Data scores, Figure Recognition, and Clerical Matching. Intercorrelations of tests obtained over the one-year period were not appreciably lower than those obtained without intervening time. (Author)

AD-278 688 Div. 28
(TISTB/AW) OTS price $3.00

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
GUIDE FOR THE ANALYSIS AND SOLUTION OF AIR BASE NOISE PROBLEMS.
Final rept. on Human Response to Vibratory Energy,
by A. C. Pietrasanta and K. N. Stevens. Nov 61, 163p. incl. illus. tables, 13 refs.
(Contract AF 33(616)3685, Proj. 7210)
(WADC TR 57-702) Unclassified report

DESCRIPTORS: *Airplane noise, *Airplane engine noise, *Jet plane noise, *Jet engine noise, Analysis, Control, Engineering, Housing, Airports, Landing fields, Military facilities.

Detailed engineering procedures for analyzing and solving air base noise problems caused by jet operations are presented. These problems are classified according to five activity areas: (a) on- and off-base housing, (b) offices and work areas, (c) group meeting, study, and rest and relaxation areas, and (d) hospitals, and important communication areas. For each of these areas, analysis procedures are described in detail, and several illustrative examples of the application of these procedures are discussed. The procedures are simplified so that personnel with little or no engineering training can readily apply them to solve air base noise problems. Also, these procedures have been developed so that all noise problems can be solved on paper. No direct measurements of air base noise are required. The guide is intended to be useful to anyone concerned with air base noise problems. It provides engineering guidance for the solution of a variety of problems, including planning new bases, modifying existing bases, and planning future modifications which may become necessary with newer aircraft. (Author)

AD-278 825 Div. 28
(TISTB/CCH) OTS price $1.75

Aviation Psychology Lab., Ohio State U. Research Foundation, Columbus.
LINEAL INCLINATION IN ENCODING INFORMATION SYMBOLICALLY ON CATHODE RAY TUBES AND SIMILAR DISPLAYS.
Final rept., June 55-Dec 57,
ed. by Earl A. Alluisi. Dec 61, 58p. incl. illus. tables, 28 refs.
(Contract AF 33(616)6166, Proj. 7184)
(ASD TR 61-741) Unclassified report

DESCRIPTORS: *Reasoning, *Coding, *Display systems, *Cathode ray tubes, Air traffic control systems, Behavior, Stimulation, Psychology, Experimental data.

Four experiments are summarized which constitute a series of investigations aimed at determining how lineal-inclination symbols should be used to encode information optimally on cathode ray tubes and similar displays in future air traffic control and related systems. An equal-discriminability scale of lineal inclination was constructed and validated in the first two studies; in addition, normative data were collected from a large number of subjects using the four alphabets specifically recommended. The second two investigations were concerned with (a) the effects of using different readout systems and (b) the effects of displaying the symbols in different visual surrounds. (Author)

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

AD-278 585 Div. 29, 33, 18
(TISTA/VGW) OTS price $4.60

Quartermaster Food and Container Inst. for the Armed Forces, Chicago, Ill.
DESIGN OF LOAD CONFIGURATIONS FOR THE M-4A HIGH SPEED AERIAL DELIVERY CONTAINER XI. LOAD CONFIGURATIONS FOR INDIVIDUAL COMBAT MEALS, TRAINING GRENADES (INERT), AND CARBINES AND AMMUNITION.
Interim rept.,
by Edward H. Schembor and A. S. Young. Mar 62, 35p. incl. illus. table, ref. (QMFCIAF rept. no. 8-62; Technical rept. no. 227)
(Proj. 7-87-03-004)
Unclassified report

DESCRIPTORS: *Air drop operations, *Containers, *Supplies, Flight testing, Effectiveness, Impact shock, Military rations, Grenades, Small arms, Small arms ammunition, Design, Parachute descents.

An analysis was made of the loading configurations of three separate loads in the M-4A High Speed Aerial Delivery container. The loads were: (1) individual combat meals; (2) inert hand grenades; and (3) carbines and ammunition. Factors considered were resistance to damage, space utilization, ease of loading, and ease of distribution. Shock ratings were determined for the rations to predict the resistance of two load designs to the impact forces developed. The first load configuration of 144 intermediate cartons sustained impact forces at velocities up to 35 fps. The second load configuration of 108 intermediate cartons sustained impact forces at velocities up to 53 fps. A load configuration of six cases of inert hand grenades was dropped at an impact velocity of 35 fps. With the addition of cushioning material, the same load was dropped at 49.5 fps, but was not capable of withstanding the impact forces. A load consisting of five caliber 30 M-1 carbines and nine boxes of caliber 30 ammunition was dropped twice to obtain resulting impact velocities of 35 and 49.5 fps. No significant damage occurred. (Author)

basic three-memory system has been defined which provides up to 32,000 words of instruction storage, 16,000 words of data storage and 1,000 words of fast 'scratch pad' storage. The bulk storage devices are expected to be composed of ferrite elements which may be sensed nondestructively at a two-megacycle rate. The 'scratch pad' device will utilize magnetic films which may be cycled at a four-megacycle rate. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-278 608 Div. 31, 5
(TISTW/DLW) OTS price $3.60

Electric Boat Div., General Dynamics Corp., Groton, Conn.
SUBIC: SHIP CONTROL XV SQUIRE. SHIPBOARD FEASIBILITY STUDY,
by George R. Simoneau. June 62, 29p. incl. illus. 1 ref. (Rept. no. U-417-62-020)
(Contract Nonr-251200)
Unclassified report

DESCRIPTORS: *Submarines, *Combat information centers, *Data processing systems, *Cathode ray tube screens, Control, Control panels, Shipborne, Installation, Operation, Effectiveness, Tests, Feasibility studies, Control systems, Display systems, Course indicators, Depth indicators.

Results are described of an operational evaluation of a prototype SQUIRE ship control display system aboard the SS(N)597 TULLIBEE. SQUIRE (for Submarine QUIckened REsponse) provides all the information necessary for controlling a submarine in course and depth in a simple usable form. The display is made possible through nonlinear control equations derived to meet the design criteria of a smooth maneuver with a minimum of overshoot and a minimum time to complete any maneuver consistent with the maximum amplitude of the variables inserted by the controller. Also included is information regarding shipboard installation, a description of the components involved in generating the display, and evaluation results. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

AD-278 454 Div. 32
(TISTP/FR) OTS price $3.60

Naval Ordnance Lab., White Oak, Md.
PROCEDURES FOR ANALYZING TECHNICAL REPORTS FOR MACHINE RETRIEVAL,
by Eva Liberman. 9 May 62, 29p. incl. illus.
(NOLTR 62-51)
Unclassified report

DESCRIPTORS: *Information retrieval, *Reports, Libraries, Vocabulary, Naval research laboratories, Digital computers.

Library procedures for analyzing technical reports for information retrieval are discussed. Identification information, subject analysis, IBM card punching and search procedures have been established to meet the needs of the Laboratory for its collection of technical reports. (Author)

AD-278 503 Div. 32
(TISTB/MS) OTS price $4.60

Space Technology Labs., Inc., Redondo Beach, Calif.
THE SCIENTIST WHO KNOWS EVERYTHING (Uchenyi Kotoryi Znaet Vse),
by R. Bershadskii, tr. by Z. Jakubski.
July 62, 41p. (Rept. no. 9990-6138-KU-000; Trans. from New World (Novyi Mir), Moscow, 38:177-197, Apr 62)
Unclassified report

DESCRIPTORS: *Information retrieval, *Documentation, Libraries, Library science, Scientific reports, Bibliography, USSR.

AD-278 538 Div. 32
(TISTB/MS) OTS price $28.50

American Geographical Society, New York.
INDIA. A COMPENDIUM,
by Raye R. Platt, Robert C. Kingsbury and others.
June 62, 586p. incl. illus. tables, refs.
(Contract Nonr-64101, Proj. NR 389-003)
Unclassified report

DESCRIPTORS: *India, *History, *Culture, *Geography, Ecology, Climate, Language, Religion, Agriculture, Industry, Minerals, Transportation, Communication systems, Economic conditions.

AD-278 551 Div. 32
(TISTB/MS) OTS price $4.60

Center for Documentation and Communication Research, Western Reserve U., Cleveland, Ohio.
THEORY OF DOCUMENTATION AND SEARCHING STRATEGY.
Final technical documentary rept.
1962, 41p.
(Contract AF 49(638)357)
(AFOSR-2710) Unclassified report

DESCRIPTORS: *Information retrieval, *Documentation, Automation, Automatic, Data processing systems, Library science, Mathematical analysis, Test equipment, Computers, Theory.

AD-278 624 Div. 32
(TISTB/MS) OTS price $2.60

System Development Corp., Santa Monica, Calif.
A RESEARCH PLAN FOR EVALUATING THE EFFECTIVENESS OF VARIOUS INDEXING SYSTEMS,
by Harold Borko. 10 July 61, 23p. incl. illus. tables, 16 refs. (Field note no. FN-5649/000/01)
(Contract AF 33(600)37684)
Unclassified report

DESCRIPTORS: *Indexes, *Information retrieval, Subject headings, Documentation, Standards, Psychology.

AD-278 663 Div. 32
(TISTB/MS) OTS price $1.60

System Development Corp., Santa Monica, Calif.
THE EFFECTS OF FORMATTING RESTRICTIONS ON THE QUALITY OF REPORT SUMMARIES PRODUCED BY HUMANS,
by John D. Ford, Jr. 11 July 62, 10p. incl. illus. tables (Rept. no. SP-707)
Unclassified report

To be presented at the American Psychological Association Meeting, St. Louis, Missouri, September 5, 1962.

Division 30-RESEARCH AND RESEARCH EQUIPMENT

Among the environmental effects encountered by a space voyager is a state of weightlessness. The effects of this weightless state on both the pilot and the equipment on board are actively being investigated. The simplest method of producing a weightless state is by dropping a body and allowing it to fall without the influence of any outside forces. A second method is to fly a ballistic trajectory in either a manned aircraft or a manned or unmanned missile. Payload, space, and economic considerations favor the manned aircraft scheme, and this method is discussed. (Author)

AD-278 698 Div. 30
(TISTB/MS) OTS price $1.60

Naval Research Lab., Washington, D. C.
A DESIGN FOR AN ANALOG COMPUTER QUICKENING DEMONSTRATION,
by J. S. Sweeney and H. P. Birmingham.
29 June 62, 9p. incl. illus. (NRL rept. no. 5781)
Unclassified report

DESCRIPTORS: *Display systems, *Control systems, *Analog computer, Feedback, Test equipment, Human engineering, Simulation, Design.

The concept and techniques of 'quickening' are being widely adopted in military and nonmilitary systems. An understanding and appreciation of the power of quickening in improving the performance of man-machine control systems is difficult to acquire on the basis of reading reports or the observation of graphs. It is really necessary to control a system or simulated system, with and without quickening, to understand the reduction of task difficulty and improvement in the accuracy of man-machine system performance which derives from the use of quickening. This report outlines a method of demonstrating the utility of quickening with respect to a synthesized hypothetical third-order control system. The system dynamics and the quickening are simulated through the use of analog computer equipment. (Author)

AD-278 704 Div. 30
(TISTW/RD) OTS price $12.00

Paratron Corp., New York.
STUDY OF INITIAL FAILURES OF PRECISION INSTRUMENT COMPONENTS,
by Joseph Berkowitz and Benjamin Sachs. Aug 61, 167p. incl. illus. tables, 54 refs.
(Contract N171-21354A)
(NAVWEPS rept. no. 7867) Unclassified report

DESCRIPTORS: *Synchros, *Servo motors, *Tachometers, Reliability, Failure (Mechanics), Quality control, Reduction, Design, Instrumentation.

Results are given of an investigation of early failures of precision instrument components (synchros, resolvers, servo motors, and motor-tachometers). The investigation included disassembly and analysis of failed units, visits to major users and manufacturers, and a research and testing program. This report contains a summary of all the findings of this study. It also presents conclusions and recommendations with regard to the design, manufacture, quality control, and application of these components from the viewpoint of reducing the incidence of early failures. (Author)

AD-278 733 Div. 30, 15
(TISTP/JW) OTS price $1.10

Mathematics Research Center, U. of Wisconsin, Madison.
A SET OF MATRICES FOR TESTING COMPUTER PROGRAMS,
by J. L. Brenner. May 62, 7p. (MRC technical summary rept. no. 325)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: *Matrix algebra, *Programming, Computer logic.

A set of matrices is defined, and the complete solution of each matrix is given. The matrices have arbitrary dimension, and a large number of parameters. By adjusting these parameters, a matrix of arbitrary dimension can be constructed which has two eigenvectors that are nearly coincident, which is derogatory (has fewer than the maximum possible number of eigenvectors), or is as nearly singular as desired. Thus a set of matrices is available which forms a convenient set of check matrices for testing computer programs which purport to solve or invert a matrix. The matrices of the set have certain properties of regularity. For selected values of the parameters, the matrices appear as variance-covariance matrices in statistics. In particular cases, the eigenvalues (but not the eigenvectors) and the determinants were found. (Author)

AD-278 835 Div. 30, 12
(TISTP/WH) OTS price $3.60

Naval Ordnance Lab., Corona, Calif.
VIP. A VARIABLE INFORMATION PROCESSING SYSTEM FOR STORAGE AND RETRIEVAL OF MISSILE DATA,
by M. Kosakoff and D. L. Buswell. 25 Apr 62, 29p. incl. illus. (Technical memo. no. 64-474)
Unclassified report

DESCRIPTORS: *Data processing systems, *Digital computers, *Programming, *Guided missiles.

The Variable Information Processing (VIP) system for the storage and retrieval of missile data is described. The storage of information in VIP format permits the flexible application of combinations of general purpose processors for the accomplishment of retrievals and summarizations. (Author)

AD-278 848 Div. 30, 8
(TISTP/WH) OTS price $2.75

Sylvania Electronic Systems, Needham, Mass.
SUBMICROSECOND SIMULATION COMPUTER STUDY PROGRAM. PART I. REQUIREMENTS AND TECHNIQUES STUDY.
Final rept., 1 May-31 Oct 61 on Training Equipment, Simulators, and Techniques for Air Force Systems,
by Edward L. Perry. May 62, 135p. incl. illus. tables, 78 refs.
(Contract AF 33(616)8092, Proj. 6114)
(MRL TDR 62-27, pt. 1) Unclassified report

DESCRIPTORS: *Digital computers, *Memory devices, *Computer logic, *Flight simulators, Ferrites, Superconductivity.

Circuit techniques and memory devices for use in implementing a submicrosecond simulation computer are either currently available or are expected to become available within a short time. Saturated transistor circuits are preferred for general usage in the system over other faster and more complex techniques because of the reduction in complexity, lower power dissipation, and more latitude in permissible tolerance variation. A

SWAMP FOX I was an extended operation conducted by the U. S. Army Transportation Board in the jungle of the Republic of Panama during part of the wet season (August to October) in 1961. The purpose of this project was to study environmental problems affecting transportation support in military operations. Sixteen military and commercial vehicles (6 tracked, 10 wheeled) participated. Five vehicles (4 tracked, 1 wheeled) completed the journey from Chepo to Santa Fe. With or without limited support, operations in this type environment constitute a severe test of the durability and effectiveness of any vehicle. However, transportation support of military operations in a tropical environment appears feasible. (Author)

DESCRIPTORS: *Abstracting, *Automation, *Effectiveness, Data processing systems, Verbal behavior, Language, Tests, Design.

Despite increasing automation of information retrieval systems humans will still be required to assist in selecting and reducing information from text. Format restrictions imposed by man-machine communication might interfere with verbal habits and result in performance degradation. However, such restrictions might result in increased effectiveness, because of partial encoding. A restricted format designated as content term diagram was compared with natural language format. Subjects were 48 male undergraduates. Each worked for eight sessions. Results supported interference prediction for time scores and subjects' evaluations of difficulty. However, term diagram summaries resulted in higher information densities and more correct responses to information requests. (Author)

AD-278 712 Div. 32
(TISTB/MS) OTS price $14.00

Rutgers U., New Brunswick, N. J.
COOPERATIVE STORAGE WARHOUSES.
Doctoral thesis,
by Helen Joanne Harrar. May 62, 203p. incl. tables, refs.
(Contract AF 49(638)849)
(AFOSR-2615) Unclassified report

DESCRIPTORS: *Libraries, *Warehouses, Costs, Economics, Storage, Effectiveness.

33. TRANSPORTATION

AD-278 459 Div. 33, 15
(TISTP/TL) OTS price $2.60

Operations Research Center, U. of Calif., Berkeley.
A RELATIONSHIP BETWEEN DENSITY FUNCTIONS,
by Frank A. Haight. 30 Apr 62, 27p. incl. tables, 7 refs. (Research rept. no. 18; IER 172-21)
(Contract Nonr-22283)
Unclassified report

DESCRIPTORS: *Operations research, *Statistical distributions, *Probability, *Functions, *Vehicles, Velocity, Measurement, Density, Taylor's series, Bessel functions, Transformations (Mathematics), Analysis of variance, Time, Integral equations, Numerical analysis.

AD-278 548 Div. 33
(TISTB/MS) OTS price $5.60

California U., Los Angeles.
AN ENGINEERING ANALYSIS OF CARGO HANDLING. XIV. OPTIMUM WAREHOUSE LAYOUT,
by John R. Huffman. Mar 62, 1v. incl. illus. tables, 9 refs. (Rept. no. 62-13)
(Contract Nonr-23307 Proj. NR 3-47-002)
Unclassified report

DESCRIPTORS: *Cargo, *Warehouses, Storage, Costs, Standards, Transportation, Supplies, Packaging, Operation, Control, Handling, Design.

The study led to the following criteria for designing a physical facility that minimizes the space and handling costs of storing unit loads of commodity: (1) There should be sufficient space in the warehouse to permit storage of any group of commodities in the space assigned to them. It should never be necessary to store unit loads of these commodities in some distant overflow area. (2) Selection of the optimum capacity is not critical since there is a range of capacities with costs ranging from the minimum possible to this minimum plus a few per cent. (3) The designer, when in doubt, should provide the larger of the alternate capacities he is considering. The additional cost to operate a warehouse larger than any in the range of optimum capacities will probably be less than that to operate a warehouse smaller than the lower limit of the range. (4) The layout, i.e., row capacity, of the storage block can be varied so long as the probability the handling units in a receipt will exceed the number of space units in a row is not less than four per cent or more than 96 per cent. (Author)

AD-278 549 Div. 33, 15
(TISTB/MS) OTS price $11.50

California U., Los Angeles.
AN ENGINEERING ANALYSIS OF CARGO HANDLING. XIII. A DETERMINISTIC PRODUCTIVITY MODEL OF MATERIALS HANDLING SYSTEMS,
by Neal A. Richardson. May 62, 153p. incl. illus., table, 9 refs. (Rept. no. 62-24)
(Contract Nonr-23307, Proj. NR 3 47-002)
Unclassified report

DESCRIPTORS: *Cargo, *Mathematical analysis, *Mathematical prediction, Transportation, Operation, Behavior, Job analysis, Human engineering, Personnel, Analysis of variance, Handling, Production.

A mathematical model was developed and employed to determine the productivity of materials handling systems comprised of two or more serial handling operations. It was the object of this study to take certain measurable characteristics of each system carrier operating independent of system-induced delays and to combine these characteristics mathematically to predict the productivity of the over-all system. A hypothetical relationship between operator work rate and a variable which defines the system state was advanced and subsequently studied experimentally. An analytical study of the productivity of a simple system comprised of two serial handling operations was done using relationships which approximated the experimentally confirmed operator work rate characteristics. Explicit solutions were obtained for this most simple case and the effect of system variables upon productivity was discussed. A method was demonstrated for using the explicit solutions obtained for a system of two serial materials handling operations to predict the productivity of systems involving more than two handling operations. (Author)

AD-278 596 Div. 33
(TISTB/MS) OTS price $10.50

Army Transportation Board, Fort Eustis, Va.
REPORT OF ENVIRONMENTAL OPERATION.
Final rept. on Swamp Fox I.
July 62, 134p. incl. illus. tables, 10 refs.
(Rept. no. TCB-61-051-EO)
Unclassified report

DESCRIPTORS: *Military transportation, *Military operations, *Military equipment, *Vehicles, Jungles, Climatic factors, Tests, Effectiveness.

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

AGRICULTURE

Animal Husbandry

PB 160 426 $2.60

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE IN VITRO MULTIPLICATION OF NEWCASTLE DISEASE VIRUS IN CHICKEN BLOOD. I. VIRUS GROWTH IN RELATION TO AMOUNT AND KIND OF SEED VIRUS, TIME OF INCUBATION AND NUMBER OF CELLS, by Erich Traub. Rept. on Project NM 005 048.11.01. 12 Feb 51, 26p. 10 refs.

DESCRIPTORS: *Newcastle disease virus, Growth, Reproduction, *Chickens, *Culture media, Blood.

The virus of Newcastle disease was cultivated in defibrinated chicken blood, thus confirming the results obtained by Dinter and Dinter in 1944. Two series of 27 and 18 culture passages, respectively, were made, each transfer representing at least a tenfold dilution. The blood culture technique was applied to quantitative studies on the multiplication of the virus in chicken blood. Chicken blood cells proved to be much less susceptible to the virus under study than embryonated chicken eggs, 1,000 to 10,000 minimal lethal doses for chick embryos being required to infect undiluted blood or blood diluted 1:10 in autologous serum. The growth rate of the virus in blood was different from the explosive growth of bacterial viruses. Experiments concerning the amount of virus produced per cell in cultures prepared from undiluted blood and blood diluted 1:10 or 1:100 in autologous serum failed to disclose a strict parallelism between the number of cells and the amount of newly formed virus, dilute blood generally producing more virus per cell than undiluted blood.

PB 160 427 $1.60

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE IN VITRO MULTIPLICATION OF NEWCASTLE DISEASE VIRUS IN CHICKEN BLOOD. II. CULTIVATION OF THE VIRUS IN LEUCOCYTE SUSPENSION, by Erich Traub and Wirth I. Capps. Rept. on Project NM 005 048.11.02. 25 Feb 51, 17p. 7 refs.

DESCRIPTORS: *Newcastle disease virus, Reproduction, *Chickens, *Culture media, Blood, *Leucocytes

Newcastle disease virus has been cultivated in leucocyte suspensions prepared from normal chicken blood by treatment with bean extract in combination with differential centrifugation at low speeds. Virus growth has been shown to occur in leucocyte suspensions containing fewer red cells than blood dilutions of 1:1,000, in which the virus has consistently failed to multiply. The predominating white cell type in the leucocyte suspensions was the lymphocyte, while polymorphonuclear leucocytes were rare or even entirely missing. The available evidence suggests that the latter cell type plays no part in the growth of Newcastle disease virus. Experiments concerning the distribution of the virus in chicken blood in vivo showed the leucocytes to be infectious after intensive washing with physiological saline.

PB 160 428 $1.60

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE IN VITRO MULTIPLICATION OF NEWCASTLE DISEASE VIRUS IN CHICKEN BLOOD. III. A STABILIZING SUBSTANCE FOR NEWCASTLE DISEASE VIRUS PRESENT IN CHICKEN AND MAMMALIAN BLOOD CELLS, by Erich Traub. Research rept. on Project NM 005 048.11.03. 27 Dec 51, 11p. 14 refs.

DESCRIPTORS: *Newcastle disease virus, Reproduction, *Culture media, Blood, Stabilizers, Mammals, *Chickens.

In the course of futile attempts to cultivate Newcastle disease virus in cell-free hemolysates prepared from washed chicken blood cells by treatment with distilled water in combination with deep-freezing and thawing it was found that such hemolysates have a marked stabilizing effect on the virus. This effect was most obvious when mixtures of hemolysate and virus were incubated at 37.5°C for four days. In the presence of hemolysate the antiviral effect of the non-specific inhibitor present in many normal chicken sera is less evident than in the presence of saline, Tyrode or Ringer solutions. Human, rabbit, or guinea pig hemolysates likewise showed a protective effect on the virus under study but were, in general, slightly less potent than chicken hemolysates. (Author)

PB 160 430 $2.60

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE MECHANISM OF IMMUNITY OF CHICKENS TO NEWCASTLE DISEASE VIRUS. I. INVESTIGATION OF THE POSSIBLE ROLE OF CELLULAR FACTORS, by Eric Traub. Vol. 11, p. 459-482. 27 Feb 53, 25p. 40 refs. Research rept. on Project NM 005 048.11.04.

NASA N62-14775 $6.60

Center for Radiophysics and Space Research, Cornell U., Ithaca, N. Y.
EXPERIMENTS RELATING TO THE LUNAR SURFACE. I. PHOTOMETRIC STUDIES. II. PROTON BOMBARDMENT OF MINERALS, by Bruce W. Hapke. Preliminary rept. no. 2 on Grant NsG-119-61. 1 July 62, 65p. 17 refs. CRSR-127.

NASA N62-14372 $1.10

Mellon Inst. of Industrial Research, Pittsburgh, Pa.
FUNDAMENTAL GEOCHEMICAL RESEARCH ON TEKTITES, STONY METEORITES, AND RADIATION DAMAGE IN RELATED SILICATE MATERIALS, by Alvin J. Cohen. Final rept. 1 Jan 60-31 Dec 61, on Grant NsG-57-60. 31 Dec 61, 2p.

Order from GPO $0.40 as I 53.8:963

Nautical Almanac Office, Washington, D. C.
EPHEMERIS OF THE SUN, POLARIS AND OTHER SELECTED STARS WITH COMPANION DATA AND TABLES FOR THE YEAR 1963. (SUPPLEMENT TO THE MANUAL OF INSTRUCTION FOR THE SURVEY OF THE PUBLIC LANDS OF THE UNITED STATES). 54th ed. 1962, 32p.

DESCRIPTORS: *Astronomical data, Sun, Stars, Tables.

PB 162 020 $8.10

Radiation Lab., U. of Michigan, Ann Arbor.
ESTIMATION OF THE PHYSICAL CONSTANTS OF THE LUNAR SURFACE, by M. Brunschwig, T. J. Ahrens (Rensselaer Polytechnic Inst.) and others. Rept. on Autometric Corp. Subcontract to Contract DA 49-018-eng-2133(E). Nov. 60, 84p. 13 refs. Rept. no. 3544-1-F; AD-253 472.

DESCRIPTORS: Meteorology, Theory, *Moon, Surface properties, Thermal radiation, Particles, Measurement, Penetration, Landing, Minerals, Electromagnetic properties, *Extraterrestrial geography, Geology, Ultrasonic properties, Physical properties.

An estimate is given for the bounds on particle size, thermal conductivity, volumetric specific heat and electromagnetic constants of the lunar surface. These constants allow us to compare rocks, meteorites, and tektites, which scientists have proposed as possible lunar materials or similar to lunar materials, with our results obtained by electromagnetic diagnostics of the lunar surface. Since the values for many of these constants were unknown, laboratory tests were made to obtain the fundamental constants of these possible lunar materials. Penetrometer tests in dust - like materials in vacuo took on new meaning. Results of these tests showed that the danger of sinking or partially sinking into the lunar surface upon landing should not be considered lightly. (Author)

PB 162 019 $3.60

Radiation Lab., U. of Michigan, Ann Arbor.
A STUDY OF LUNAR THERMAL EMISSION, by Alain Giraud. Rept. on Autometric Corp. Subcontract to Contract DA 49-018-eng-2133E. Sep 60, 39p. 30 refs. Rept. no. 03544-1-T; AD-253 471.

DESCRIPTORS: Meteorology, *Moon, Theory, *Thermal radiation, Radar reflections, Measurement, *Wave analysis, Radio waves, Surface properties, Thermionic emission, Electromagnetic wave reflections, *Infrared radiation.

A theoretical analysis of thermal radio emission from the moon is carried out and the available observational data reviewed. Values for the electromagnetic parameters of the moon's surface based on the results of radar investigations are used, thus enabling determination of the thermal parameters of the surface through a comparison between theoretical and experimental results. The thermal values obtained are found to be compatible with the character of the moon's surface layer suggested by radar experiments as well as by polarimetric and infrared measurements. (Author)

BEHAVIORAL SCIENCES

PB 160 450 $2.60

Naval Medical Research Inst., Bethesda, Md.
SYMPATHETIC ACTIVITY AND PERCEPTION. AN APPROACH TO THE RELATIONSHIP BETWEEN AUTONOMIC ACTIVITY AND PERSONALITY, by Enoch Callaway, III and Samuel V. Thompson. Vol. 11, p. 407-426. Research rept. on Project NM 004 008.04.01.

DESCRIPTORS: *Autonomic nervous system, *Visual perception, *Personality, Reaction (Psychology), Feedback.

Psychological activity such as the perception of a fearful object can evoke autonomic changes. The inverse of this operation is, however, poorly understood. The authors have investigated this problem, namely, how, if at all, does autonomic activity influence psychological activity. An hypothesis is presented concerning an effect of autonomic activity on personality which is in essence an inverse feedback concept. If awareness of and reaction to a threat induces a sympathetic discharge, then sympathetic activity would be expected to have an inverse effect on the awareness of cues. This postulated decrease in awareness and reactivity has been termed decreased extroceptive input by the authors. This hypothesis was tested by observing changes in visual perception produced by increased endogenous sympathetic activity. Using both a cold-pressor procedure and amyl nitrite inhalations as methods of inducing sympathetic activity, a consistent decrease in the apparent size of a distant object relative to a nearer object was observed. Evidence was presented to demonstrate that this was not due to local ophthalmic effects nor to decreased attention, but rather explainable on the basis of decreased size constancy which could result from a narrowed awareness with reduction of reaction to distance cues. (Author)

DESCRIPTORS: *Newcastle disease virus, *Chickens, *Cells (Biology), *Immunology, Antibodies, Culture media, Blood, Leukocytes

The possible role of cellular factors in the immunity of chickens to Newcastle disease virus has been investigated by using blood cells of immune and normal birds as model cell systems containing both cells susceptible to infection and cells potentially capable of phagocytosis. It has been shown that the cells themselves do not become immune, but that they are capable of fixing protective antibody to such a degree that the union cannot be completely split by 7 to 10 washings in Tyrode's solution. The degree of fixation was different in different immune birds. In vitro phagocytosis of virus by leucocytes of immune birds has not been observed and evidence against antibody production by blood cells in vitro has been obtained. Blood cells of chickens immunized with active virus never proved infectious after very thorough washing, a result suggesting that the immunity of chickens to Newcastle disease is not an "infection immunity" and that the interference phenomenon therefore does not play an important part in the mechanism of this immunity. (Author)

PB 160 431 $2.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES ON THE MECHANISM OF IMMUNITY OF CHICKENS TO NEWCASTLE DISEASE VIRUS. II. EXPERIMENTS CONCERNING THE MODE OF ACTION OF ANTIBODIES, by Eric Traub. 27 Feb 53, 27p. 26 refs. Research rept. on Project NM 005 048.11.05.

DESCRIPTORS: *Newcastle disease virus, *Chickens, Cells (Biology) *Immunology, *Antibodies, Culture media, Blood.

In vitro experiments with Newcastle disease virus and normal chicken blood cells as a model virus-cell system have shown that the protective antibody in hyperimmune chicken serum acts both on the cells and on the virus. Both reactions have been studied using quantitative methods of investigation. In either case, the reaction is enhanced by time and temperature. Virus neutralization by protective antibody did not follow the "percentage law". It was markedly inhibited by an excess of antigen, especially when dilute immune serum was used. The possible significance of this observation for passive immunization and serum therapy has been pointed out. Normal chicken sera either enhanced, failed to influence, or inhibited virus neutralization by protective antibody. An antiviral substance obtained from thoroughly washed blood cells of hyperimmunized chickens appeared to be a residue of protective antibody very firmly fixed by the cells. Evidence has been obtained suggesting that the antibody responsible for hemagglutination inhibition acts only on the virus and has no affinity for blood cells in contrast to the protective antibody. (Author)

ASTRONOMY

Order from GPO $0.50 as
D 301.49/4:LAC 57

Aeronautical Chart and Information Center, St. Louis, Mo.
LUNAR CHART, KEPLER LAC 57 (MERCATOR PROJECTION). 2nd. edition. May 62, 1 chart.

DESCRIPTORS: *Moon, Terrain, *Maps.

Order from GPO $0.50 as
D 301.49/4:LAC 75

Aeronautical Chart and Information Center, St. Louis, Mo.
LUNAR CHART, LETRONNE LAC 75 (MERCATOR PROJECTION). 2nd. edition. June 62, 1 chart.

DESCRIPTORS: *Moon, Terrain, *Maps.

Order from GPO $0.50 as
D 301.49/4:LAC 93

Aeronautical Chart and Information Center, St. Louis, Mo.
LUNAR CHART, MARE HUMORUM LAC 93 (LAMBERT CONFORMAL PROJECTION). 1st. edition. June 62, 1 chart.

DESCRIPTORS: *Moon, Terrain, *Maps.

Astrophysics

NASA N62-14407 $2.60

Boston U., Mass.
TEKTITE PROJECT, by Sumner M. Wolfson. Research rept. 9 on Grant NsG-21-59. Aug 61, 22p. Astronomical contributions, series 11, no. 10.

NASA N62-14426 $1.10

California U., La Jolla.
THE TRITIUM CONTENT OF THREE STONY METEORITES AND ONE IRON METEORITE, by A. E. Bainbridge, M. E. Suess, and H. Wanke. Rept. on Grants NsG-97-60 and NsG-98-60. Nov 61, 6p. 17 refs.

use of the lo-log (I_o/I) as the absorption variable facilitates the comparison of spectra when (as is usually the case) the specimen thickness and concentration are unknown.

PB 160 409 $1.10

Naval Medical Research Inst., Bethesda, Md.
A SPECIES VARIATION IN PROTHROMBIN DETERMINATIONS ON USING SEVERAL THROMBOPLASTIC AGENTS, by George H. Lawrence and Eugene P. Cronkite. Rept. no. 9 on Project NM 007 039. 9 June 48, 10p. 4 refs.

DESCRIPTORS: *Prothrombin, *Blood coagulation, Coagulases, Blood plasma, Animals

Utilizing a one-stage prothrombin system, the coagulation time of plasma for man, dog, pig, goat, and rabbit was determined with thromboplastin extracted from human lung, pig lung, goat lung, dog lung, calf lung, and rabbit brain. There are species variations in the coagulation time when tested with a given thromboplastin. Pig lung provides the most active thromboplastin for the species tested. Rabbit brain thromboplastin is most active for man. (Author)

PB 160 410 $1.10

Naval Medical Research Inst., Bethesda, Md.
THE SPONTANEOUS LEUKOCYTE AND TEMPERATURE VARIATION IN UNTREATED RABBITS STUDIED UNDER CONTROLLED CONDITIONS, by Richard S. Farr, P. K. Schork, and C. H. Gayhart. Rept. no.12 on Project NM 007 039. 28 July 48, 11p.

DESCRIPTORS: *Leukocytes, *Body temperature, *Rabbits, Diurnal variations.

The spontaneous variation in the leukocyte population and in the temperature of 20 apparently normal rabbits was studied during a six-hour period. The dietary and environmental conditions were kept as constant as possible. The leukocyte counts, and to a lesser extent the temperature readings, of individual animals varied considerably during six consecutive hours of study. By pooling data, definite trends in the temperature and leukocyte population became evident. The total number of leukocytes and the mononuclear cells decreased during the study period while the heterophiles and the temperature increased. It is concluded that these changes are of sufficient magnitude that they must be considered when planning and interpreting investigations which involve the use of frequent temperature and leukocyte determinations. (Author)

PB 160 413 $2.60

Naval Medical Research Inst., Bethesda, Md.
STEROIDOGENESIS BY INTACT CALF ADRENAL PERFUSED IN VITRO, by George Rosenfeld. Vol. 12, p. 669-694. 22 Dec 54, 26p. 28 refs. Research rept. on Project NM 006 012.04.75.

DESCRIPTORS: Steroids, *Adrenal glands, *Secretion, *Corticosteroids, Cattle.

The principal objectives of this investigation containing the results of 134 adrenal perfusion studies were (1) to establish relatively simple and defined experimental conditions, devoid of the metabolic influences of nonadrenal tissues, under which steroidogenesis could be studied in intact calf adrenals perfused in vitro, and (2) to modify these fundamental conditions by the omission, addition or change in concentration of physiological substances found in the blood stream in order to ascertain whether the adrenal cortex can independently adapt its secretory activity and respond directly to these alterations.

PB 160 415 $1.60

Naval Medical Research Inst., Bethesda, Md.
THE STIMULATIVE EFFECT OF ACETYLCHOLINE ON THE ADRENOCORTICAL FUNCTION OF ISOLATED PERFUSED CALF ADRENALS, by George Rosenfeld. Vol. 13, p. 177-188. 2 May 55, 13p. 37 refs. Research rept. on Project NM 006 012.04.85.

DESCRIPTORS: *Stimulation, *Acetylcholines, *Adrenal glands, Secretion, Cattle.

The experimental design involved the perfusion of intact calf adrenal glands, isolated from the metabolic influences of other tissues including blood, with a well-oxygenated artificial medium. The results demonstrated that ACh concentrations varying from 2.7×10^{-5} M to 5.0×10^{-4} M exerted an acute and direct stimulative effect on adrenocortical function. Their excitatory influence was manifested mainly by the augmented production and release of 17-hydroxylated corticosteroids. Higher concentrations (5.0×10^{-3}M) failed to enhance adrenocortial activity. Physostigmine (2.7×10^{-5} M) sensitized whereas atropine (1.4×10^{-5} M) blocked the acceleration of steroidogenesis by ACh. The stimulative action of ACh on cortical tissue is not attributable to the choline and acetate which may be derived from its hydrolysis, nor is it mediated via an ACh-induced mobilization of adrenaline or noradrenaline from the medullary tissue. The significance of the findings are discussed with respect to a possible direct, regulatory role of ACh in the adrenocortical activity of the intact animal.

PB 160 441 $2.60

Naval Medical Research Inst., Bethesda, Md.
A STUDY OF THE HISTOLOGIC STRUCTURE OF THE CERVIX IMMEDIATELY POSTPARTUM, by L. V. Dill. Rept. no. 1 on Project NM 007 022. 30 Aug 48, 27p. 14 refs.

DESCRIPTORS: *Histology, *Uterus, Tissues (Biology) *Childbirth.

The purpose of this study is to determine whether the histologic structure of the cervix, as a whole or in part, affects the length of labor. Biopsies removed from the anterior and posterior lips of the cervices

NASA N62-10369 $14.00

Allied Research Associates, Inc., Boston, Mass.
A REVIEW OF BIOLOGICAL MECHANISMS FOR APPLICATION TO INSTRUMENT DESIGN, by J. Healer, A. Arms and others. Summary rept. on Contract NASr-16. Jan 62, 203p. 89 refs. Document no. ARA-1025.

TID-16163 $2.60

Michigan U., Ann Arbor.
CERTAIN MULTIVARIATE PROBLEMS ARISING IN HUMAN GENETICS, by William J. Schull and Akio Kudo. [1962] 22p. 5 refs.

PB 160 063 $1.60

Naval Medical Research Inst., Bethesda, Md.
A RECORDING TWO-CHANNEL PHOTOFLUOROMETER FOR IN VIVO STUDIES WITH FLUORESCEIN, by David Minard, Elliott F. Osserman, and Maynard Eicher. Rept. on Project NM 007 081.07.06. 23 Aug 50, 19p. 10 refs.

DESCRIPTORS: *Fluorometers, *Fluorescence, *Tissues (Biology), Medical cameras.

A two-channel, recording photofluorometer has been described for the study of the fluorescence of two tissue areas simultaneously following the injection of sodium fluorescein in small doses. A 4-watt mercury vapor lamp serves as the ultraviolet source and a photomultiplier tube as the photosensitive element in each unit. Two types of holders are described: a hollowed block of bakelite to which quartz rod extensions may be mounted for studies of deep tissues, and "V" shaped holds made from brass cones. Both are lined with polished aluminum foil. Sensitivity can be adjusted in fixed steps from maximum to 1/20 maximum. By means of a zero adjustment the galvanometer base line can be established and recordings made at maximum sensitivity. Oscillographic galvanometers record the outputs of both units simultaneously. Records obtained using a simple circulatory model and in selected animal experiments illustrate the applications of the instrument. (Author)

PB 160 436 $1.60

Naval Medical Research Center, Bethesda, Md.
STUDIES ON THE VARIABILITY OF CUTICULAR PATTERNS IN PURE LINES OF MELOIDOGYNE SPP. THE ROOT-KNOT NEMATODE, by Victor H. Dropkin. Vol. 11, p. 857-868. 11 Aug 53, 13p. 8 refs. Research rept. on Project NM 005 048.21.01.

DESCRIPTORS: Genetics, *Nematodes, Plants, Parasites.

Single larva infections of host plants yielded populations of offspring which were compared with control populations of mixed parentage. The infectivity varied from about 1.5 percent in trials of M. acrita, M. hapla, and M. arenaria on Marglobe tomato to 19 percent in trials of M. acrita on Allgold sweet potato. The variability of the cuticular patterns in populations of offspring of single larvae of M. acrita was significantly lower than that of the control or "wild" populations. In M. arenaria there was no measurable difference in this character between single larva offspring and "wild" populations. It is concluded that at least in M. acrita the general shape and perhaps some of the details of the cuticular patterns are under the control of heredity. (Author)

Anatomy and Physiology

PB 160 075 $1.60

Naval Medical Research Inst., Bethesda, Md.
REVASCULARIZATION OF THE RAT LIVER FOLLOWING INTERRUPTION OF THE HEPATIC ARTERY, by Robert P. deLong. Vol. 11, p. 815-826. 27 July 53, 13p. 21 refs. Research rept. on Project NM 006 012.07.02.

DESCRIPTORS: Blood vessels, *Blood circulation, *Liver, *Obstruction (Physiology), *Regeneration, Aorta, Arteries.

The problem of revascularization of the liver following ligation of the hepatic artery has recently assumed prominence. Experiments were designed to study the regrowth of the hepatic artery in the rat following complete interruption of the artery. These were accomplished by injecting a vinylite solution into the aorta and portal vein. First the normal anatomy of the hepatic artery of the rat was studied. By the third postoperative day, the first evidence of new arterial growth from the stump of the ligated artery appeared. It was almost complete by the seventh day. A pericholedochal network provided the pathway to the hilus of the liver. Many collaterals appeared, supplying the gastroduodenal artery, which was the main source of supply to the hepatic stump. No spore-bearing anaerobes, which normally inhabit the liver of many experimental animals, could be found in the rat. Partial hepatectomy had no effect on the rate of revascularization. The possibility of a chemotactic stimulus causing the revascularization was discussed. (Author)

PB 160 407 $3.60

Naval Medical Research Inst., Bethesda, Md.
SOME STUDIES ON THE INFRARED ABSORPTION OF THE CONTRACTILE SYSTEM OF SKELETAL MUSCLE, by Manuel F. Morales and Louis P. Cecchini. Rept. on Project NM 000 018.04.03. 23 June 50, 40p. 27 refs.

DESCRIPTORS: *Infrared radiation, Absorption, *Muscles, Tissues (Biology), *Muscle proteins.

Freezing-drying-pressing techniques are described for preparing spectroscopic specimens of muscles in various stages of contraction and of actomyosin-nucleotide mixtures at various stages of reaction. The

PB 160 061 $1.60

Naval Medical Research Inst., Bethesda, Md.
THE REACTION BETWEEN ACTOMYOSIN AND VARIOUS NUCLEOTIDES AND PHOSPHATES, AS FOLLOWED BY ULTRAVIOLET ABSORPTION, by Eugenia Tarver and Manuel Morales. Rept. on Project NM 000 018.04.02. 23 June 50, 16p. 9 refs.

DESCRIPTORS: *Muscle proteins, Nucleotides, *Adenosine phosphates, Ultraviolet radiation, Absorption, *Spectrographic analysis, *Recombination reactions, *Adenine derivatives.

Interaction of actomyosin with adenine derivatives and phosphates was followed by ultra-violet absorption. Irreversible spectral changes were observed with ATP, ADP, A-5-MP and adenosine, but not with A-3-MP, adenine, phosphate buffer or sodium tripolyphosphate. These changes, characterized by an increase in optical density at wave lengths below 250 mμ and decrease above 250 mμ, caused a shift of the maximum absorption from 260 mμ to 250 mμ. On subtracting the actomyosin absorption from the observed optical densities at equilibrium, the spectrum obtained was that of hypoxanthine derivatives. The reaction was thus shown to be deamination of the adenosine derivatives.

PB 160 076 $1.10

Naval Medical Research Inst., Bethesda, Md.
REVERSIBILITY AND EQUILIBRIUM OF THE GLUTAMINASE REACTION, OBSERVED CALORIMETRICALLY TO FIND THE FREE ENERGY OF ADENOSINETRIPHOSPHATE HYDROLYSIS, by T. H. Benzinger and R. Hems (Oxford U.). Vol. 14, p. 949-954. 17 Dec 56, 7p. 11 refs. Research rept. on Project NM 000 018.17.01.

DESCRIPTORS: *Recombination reactions, *Glutaminases, Enthalpy, Calorimetry, *Adenosine phosphates, Hydrolysis.

The free energy change of glutamine hydrolysis has been determined by microcalorimetric equilibrium measurements and found to be $\Delta F^{\circ}_{310} = -3430$ cal/mole. From this result and earlier free energy determinations of the glutamine synthetase reaction by Levintow and Meister follows directly the free energy change of ATP hydrolysis: at pH 7.0 and 37° C., $\Delta F'_{310} = -7730$ cal/mole. The method of determining free energy, heat, and entropy changes of equilibrium reactions from calorimetric measurements using the principle of rapid dissipation has herewith been extended to a practically, though of course not conceptually, irreversible process. (Author)

PB 160 403 $1.10

Naval Medical Research Inst., Bethesda, Md.
SOME OPTICAL OBSERVATIONS ON THE INTERACTION BETWEEN ACETYL CHOLINESTERASE AND ITS SUBSTRATE, by S. L. Friess, J. J. Blum, and M. F. Morales. Vol. 11, p. 1237-1255. 7 Dec 53, 8p. 3 refs. Research rept. on Project NM 000 018.06.30.

DESCRIPTORS: *Spectrographic analysis, Neuromuscular transmission, *Acetylcholines, *Cholinesterase, Ultraviolet spectroscopy, Chemoreceptors

A primary postulate of the Nachmansohn hypothesis of conduction in nerve is the existence of a so-called receptor protein in the nerve membrane which alters its shape on the adsorption of acetyl choline ions. One attractive variation in this theory which has now been subjected to preliminary testing is the hypothesis that the enzyme acetyl cholinesterase may function as this receptor protein, undergoing a shape change during its normal operation as a hydrolysis catalyst. Using purified enzyme derived from electric eel tissue, two sets of optical measurements have been made on the reacting system acetyl choline-acetyl cholinesterase. Observations derived from the ultraviolet absorption spectra indicate that a shape change for the reacting enzyme is a distinct possibility. However, light scattering experiments with visible light do not lend further support to this view since the data observed for the reacting mixture reproduce the results for the enzyme alone, within the ± 2 percent precision of the measurements. (Author)

PB 160 419 $1.10

Naval Medical Research Inst., Bethesda, Md.
STUDIES OF THE METABOLISM OF GALLIUM. IV. EFFECT OF GALLIUM ON ALKALINE PHOSPHATASE AND CALCIFICATION IN VITRO, by John I. Munn and H. C. Dudley. Vol. 11, p. 1-8. 5 Feb 53, 9p. 13 refs. Research rept. on Project NM 007 081.06.13.

DESCRIPTORS: *Gallium, Metabolism, *Cartilage, Bone, Calcification, Phosphorus, Enzynes, *Phosphatases.

Studies of the influence of gallium on cartilage alkaline phosphatase in vitro show that there is a gallium concentration range (2.50×10^{-6} to 1.0×10^{-5}M) which markedly increases the activity of this enzyme. Higher gallium citrate and equimolar sodium citrate concentrations prevent the reduction of phosphomolybdic acid in the Fiske-Subbarow method. By Von Kossa's silver staining technique, in vitro calcification of rachitic rat tibias and femurs have been studied. With 5.0×10^{-6}M gallium there appears to be a slight increase in calcium deposition over the equimolar sodium citrate control. (Author)

PB 160 437 $2.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES UPON FLUORESCENT INSULIN CONJUGATES, by Robert F. Steiner and A. J. McAlister. Vol. 14, p. 987-1010. 17 Dec 56, 25p. 11 refs. Research rept. on Project NM 000 018.06.55; AD-132 825.

DESCRIPTORS: *Proteins, *Insulin, Fluorescence, Molecular weight, Molecular rotation, Polarization.

Measurements of excited lifetime and of degree of polarization have been made upon fluorescent conju-

of 100 women immediately postpartum were studied. The cervical architecture was divided into zones and a comparison of these zones was carried out with accurate measurements of the areas covered by each type of tissue. The degree of firmness of each area was arbitrarily estimated. By the methods employed, it was impossible to correlate the length of labor with the quantity or quality of the epithelium, the fibrous tissue, the muscular or the vascular elements which go to make up the human cervix. (Author)

PB 160 443 $1.60

Naval Medical Research Inst., Bethesda, Md.
A STUDY OF TOTAL BODY WATER IN RATS AND IN MICE, by John Annegers. Vol. 12, p. 575-586. 7 Dec 54, 11p. 16 refs. Research rept. on Project NM 007 081.16.03.

DESCRIPTORS: *Water, *Rats, *Mice, Body weight, Fats

This study constitutes a test of the generalization that the fat-free animal body contains a constant fraction of water. Total body water by desiccation, total body fat by ether extraction, and fat-free dry body weight were measured in normal mice and normal rats, and in starved and dehydrated rats. In normal animals total body water was nearly a direct proportion of fat-free dry weight and body fat had no independent effect on total body water. On the other hand, in adult female rats starvation plus dehydration reduced total body water, expressed as a percent of fat-free weight, by about one percent/day over a 5 day period. Thus, 16 normal rats averaged 72.2 percent water, and after 1, 2, 3, 4, and 5 days the percent water averaged 71.7, 70.6, 69.7, 68.4, and 67.5 respectively in groups of 3 to 6 rats. Fourteen female mice and three weanling rats had 74.0 and 74.7 percent total body water respectively, significantly more than did normal adult female rats. Seven normal adult male rats averaged 73.0 percent total body water, expressed as percent of fat-free body weight. This figure does not differ significantly from that for normal adult female rats. (Author)

PB 160 378 $1.10

Naval Medical Research Inst., Bethesda, Md.
TOLERANCE OF THE DOG TO EXTREME COLD EXPOSURE, by Richard H. Egdahl, David M. Hume, and John B. Richards. Vol. 14, p. 389-394. 6 May 56, 7p. 5 refs. Research rept. on Project NM 007 081.22.10.

DESCRIPTORS: *Dogs, *Exposure, Physiology.

No ill effects and virtually constant rectal temperatures were observed in 16 of 17 unanesthetized dogs exposed to -46° to -50°C. and -76° to -80°C. for periods of from 3 to 27 hours. Two bilaterally adrenalectomized dogs withstood -46° to -50°C. for 4-1/2 hours and one adrenalectomized dog withstood -5°C. for 8 hours without any obvious adverse effects. The course of these animals was in no way different from those with intact adrenals exposed to the same temperatures for the same periods of time. (Author)

Biochemistry

NASA N62-10197 $2.60

Mississippi State U., State College.
BIOCHEMICAL STUDY OF MIXED CULTURE PROTOTYPE IN A CLOSED ECOLOGICAL SYSTEM, by R. G. Tischer. Progress rept. no. 3, 1 July-1 Dec 61, on NASA Grant NsG-80-60. [1962] 29p. 9 refs.

NASA N62-14930 $8.10

Mississippi State U., State College.
BIOCHEMICAL STUDY OF MIXED CULTURE PROTOTYPE IN A CLOSED ECOLOGICAL SYSTEM, by R. G. Tischer. Progress rept. no. 4, 1 Jan 61-1 July 62, on Grant NsG-80-60. [1962] 86p. 19 refs.

PB 160 059 $1.60

Naval Medical Research Inst., Bethesda, Md.
RATES AND ENERGIES OF ACTIVATION OF THE ACID-CATALYZED HYDROLYSIS OF ADENOSINE TRIPHOSPHATE, by S. L. Friess. Vol. 10, p. 599-608. 7 Nov 52, 11p. 6 refs. Research rept. on Project NM 000 018.06.19.

DESCRIPTORS: *Reaction kinetics, Enthalpy, *Hydrolysis, *Adenosine phosphates, Acids, Catalysts.

The activation energetics of hydrolysis of the biologically important adenosine triphosphoric acid (ATP) molecule have been studied over the temperature range 40-50°, for comparison with corresponding quantities for the hydrolysis of the simpler polyphosphates, and with the myosin-catalyzed ATP dephosphorylation process. The rates of acid-catalyzed ATP hydrolysis at 50° are intermediate in value between those rates previously observed for triphosphoric and pyrophosphoric acid hydrolysis, are directly proportional to the acidity of the medium in the pH range 1-1.5, and are dependent in a complex way on total salt concentration.

PB 160 060 $1.10

Naval Medical Research Inst., Bethesda, Md.
RATES OF HYDROLYSIS OF FRUCTOSE-6-PHOSPHORIC ACID, by S. L. Friess. Vol. 10, p. 111-116. Research rept. on Project NM 000 018.06.14.

DESCRIPTORS: *Hydrolysis, *Fructose phosphates, Reaction kinetics, *Ribose phosphates, Molecular association.

In studies concerned with the acid-catalyzed cleavage of a terminal phosphate group from the adenosine triphosphate molecule, it was essential to have some estimate of the magnitude of the rate for the competing, non-terminal hydrolysis reaction at the ribose-phosphorus linkage. For this purpose, fructose-6-phosphoric acid (FPA) was selected as an available model compound to yield order of magnitude information on the hydrolysis rate of the primary sugar hydroxyl-phosphorus grouping.

had been given S. flexneri 3 vaccine; the first inoculations had been administered in January 1952 and the procedure extended through the obersvation period. Local and systemic reactions to the vaccine were not remarkable except on one ship. From a total of 21,128 individuals there were 28,694 fecal specimens examined for enteric pathogenic bacilli; no Salmonella were recovered, but Shigella organisms were isolated from 95 asymptomatic carriers and from 3 clinical cases of shigellosis. Subsequent to antibiotic treatment, follow-up studies of the 98 individuals failed to yield additional Shigella isolates. Bacteriologic results indicated that previous outbreaks of shigellosis on two of the ships were unrelated, thus illustrating the importance of determining the specific etiologic agent at the time an epidemic occurs. Further evidence of shipboard dissemination of Shigella among personnel was obtained by the detection of asymptomatic carriers whose only known exposure to the organisms was contact with other carriers. Since the only asymptomatic carriers and clinical cases of shigellosis were encountered by the first study team, it was believed that detection and successful treatment of such individuals reduced the health hazard of bacillary dysentery for Pacific Fleet personnel. A final evaluation of the dysentery control program was not attempted. (Author)

PB 160 422 $2.60

Naval Medical Research Inst., Bethesda, Md. STUDIES ON RENAL CORTICAL ISCHEMIA USING THE RECORDING PHOTOFLUOROMETER, by David Minard and E. F. Osserman. Rept. on Project NM 007 081.03.02. 22 Aug 50, 25p. 7 refs.

DESCRIPTORS: *Kidneys, *Anoxia, Medical cameras, Fluoroscopes, *Fluorescent dyes, Epinephrine, Stimulation, Autonomic nervous system.

To record repeated observations on both kidneys simultaneously, the two-channel photofluorometer was used in studies of renal cortical ischemia resulting from epinephrine injections, splachic nerve stimulation and asphyxia in anesthetized monkeys and rabbits. Arrival of sodium fluorescein at each kidney surface following rapid controlled intravenous injection of small doses of dye (2 mg. per kilo) is recorded as a rising and falling curve of typical form. Failure of injected dye to produce an appreciable increase in fluorescence is the criterion for ischemia. Blood pressure, injection time, and in some experiments urine flow from each kidney a re also recorded.

PB 160 432 $1.10

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE SCHWARTZMAN PHENOMENON. I. THE INHIBITORY ACTION OF NITROGEN MUSTARD (HN_2) by Henry A. Schlang. Rept. on Project NM 000 018.05.01. 19 May 50, 7p. 5 refs.

DESCRIPTORS: *Nitrogen mustards, *Necrosis, Tissues (Biology), Inhibition.

Inhibition of the Shwartzman phenomenon by HN_2 is confirmed. Protection of the preparatory site from HN_2 fails to influence the inhibition. Protection of the lower limbs from the action of HN_2 by aortic occlusion decreases or prevents the inhibition. (Author)

PB 160 433 $1.10

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE SCHWARTZMAN PHENOMENON. II. THE SUPPRESSIVE ACTION OF NITROGEN MUSTARD (HN_2) by H. A. Schlang. Vol. 10, p. 59-64. 14 Mar 52, 6p. 6 refs. Research rept. on Project NM 000 018.05.02.

DESCRIPTORS: *Necrosis, Tissues (Biology), Inhibition, *Nitrogen mustards, Antigens, Antibodies, Sensitization, Bacteria.

The phenomenon of local tissue reactivity to bacterial filtrates (Shwartzman phenomenon) is readily suppressed by nitrogen mustard when the provocative injection consists of bacterial filtrate. When an antigen-antibody reaction in vivo is substituted for the intravenous injection of bacterial filtrate, the strong suppressive activity of nitrogen mustard is again exhibited. (Author)

PB 160 435 $1.60

Naval Medical Research Inst., Bethesda, Md. STUDIES ON THE USE OF VIRULENT TREPONEMA PALLIDUM AS AN ANTIGEN IN A COMPLEMENT-FIXATION TEST FOR THE SERODIAGNOSIS OF SYPHILIS, by Robert L. Tuttle and Patricia DeBerry. Vol. 13, p. 769-778. 8 Nov 55, 11p. 14 refs. Research rept. on Project NM 005 048.17.02.

DESCRIPTORS: *Treponema pallidum, Antigens, *Biochemical tests, Diagnosis, *Diseases, *Venereal diseases.

Preliminary results using lipid-solvent-treated suspensions of T. pallidum obtained from acute rabbit syphilomas as antigen in a complement-fixation test for the serodiagnosis of syphilis, indicate a favorable comparison when this test system is employed and a comparison made with the treponemal immobilization test and certain cardiolipin serologic tests. Nonextracted suspensions of T. pallidum are highly anticomplementary. Either acetone or ether is effective, under specific conditions of extraction, in reducing the anticomplementary activity and increasing the sensitivity and specificity of the antigen. (Author)

PB 160 363 $1.10

Naval Medical Research Inst., Bethesda, Md. VENTRICULAR FIBRILLATION IN DOGS AFTER SUDDEN RETURN OF FLOW TO THE CORONARY ARTERY, by William H. Sewell, Douglas R. Koth, and Charles E. Huggins. Vol. 12, p. 325-330. 29 June 55, 7p. 7 refs. Research rept. on Project NM 007 081.26.02.

DESCRIPTORS: *Pathology, Cardiac muscle, *Blood circulation, *Heart, Dogs, Surgery

gates of insulin with 1-dimethylaminonaphthaline-5-sulfonic acid. These results indicate that several organic agents serve to produce a limiting rotational kinetic unit of lower relaxation time than that found in water. (Author)

PB 160 449 $1.60

Naval Medical Research Inst., Bethesda, Md.
SWELLING OF PROTEIN MOLECULES IN SOLUTION AND THE ALPHA-BETA TRANSFORMATION, by Terrell L. Hill. Vol. 14, p. 201-210. 1 Mar 56, 11p. 9 refs. Research rept. on Project NM 000 018.06.49.

DESCRIPTORS: *Proteins, *Serum-albumin, Solutions, Molecules, Transformations, Theory, Mathematical analysis.

The suggestion of Yang and Foster that bovine serum albumin swells at low pH because of an α - β transformation is examined theoretically using a necessarily approximate treatment. The conclusion reached is that the Yang-Foster mechanism is a reasonable possibility. The theory, in its present form, predicts a salt effect of opposite sign to that found experimentally. Refinements in the theory will presumably remove this discrepancy. (Author)

Microbiology

PB 160 062 $1.10

Naval Medical Research Inst., Bethesda, Md.
THE RECOVERY OF POLIOMYELITIS VIRUS AFTER PARENTERAL INTRODUCTION INTO COCKROACHES AND HOUSEFLIES, by Herbert S. Hurlbut. Rept. no. 8 on Project NM 005 007. 14 Apr 49, 6p. 6 refs.

DESCRIPTORS: *Poliomyelitis virus, Recovery, *Cockroaches, *Houseflies.

Virus of the mouse-adapted Lansing strain of poliomyelitis was inoculated into the hemocele of German cockroaches and houseflies to determine whether the virus would remain active for an appreciable period of time under these conditions. Emulsions of the bodies of the cockroaches and flies surviving for 15 and 12 days respectively produced typical paralysis in mice when inoculated intracerebrally. (Author)

PB 160 429 $1.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES ON THE KINETICS OF ADSORPTION OF BACTERIOPHAGE BY BACTERIA, by Myles Maxfield and C. Levich. Rept. no. 3 on Project NM 000 002. 3 Feb 48, 19p. 12 refs.

DESCRIPTORS: *Adsorption, *Bacteria, *Bacteriophages, Antigens, Antibodies.

The adsorption of bacteriophage by susceptible bacteria was studied to determine some of the kinetic properties of the reaction. The graph of the phage-bacterium reaction indicates a very rapid adsorption for the first five minutes. A small percentage of bacteriophage remains free in the medium unattached to bacteria, at least up to 120 minutes after the start of the reaction. Antigen-antibody reactions are said to be slower. The phage-bacterium reaction is not entirely reversible after fifteen minutes. A purified suspension of bacteriophage is homogeneous with respect to the rate of adsorption by bacteria. The bacterial receptors in a single strain of staphylococci are homogeneous with respect to their rate of adsorbing bacteriophage. In other words both reactants in the phage-bacterium reaction are homogeneous with respect to the property involved. These properties are roughly similar to those of the antigen-antibody reaction. (Author)

PB 160 451 $1.10

Naval Medical Research Inst., Bethesda, Md.
SYNTHESIS OF ORGANIC ACIDS BY SALMONELLA ANATUM FROM DL - ALANINE, by Frank Davis. Vol. 10, p. 911-920. 17 Nov 52, 10p. 4 refs. Research rept. on Project NM 005 048.19.03.

DESCRIPTORS: Synthesis, *Organic acids, *Alanines, *Salmonella.

An analysis of a Salmonella anatum cell-free filtrate for organic acids synthesized from DL-alanine was made by means of celite partition columns and paper chromatography. Formic, acetic, propionic, n-butyric, and n-valeric acids were isolated and identified. The nonvolatile acids were also characterized. (Author)

Pathology

TID-16125 $8.10

Children's Cancer Research Foundation, Boston, Mass.
PROGRESS REPORT. 1 May 61-30 Apr 62, on Contract AT(30-1)-1753. 83p. 32 refs.

PB 160 074 $1.10

Naval Medical Research Inst., Bethesda, Md.
RESULTS OF A SHIPBOARD DYSENTERY CONTROL PROGRAM, by L. A. Barnes, L. B. Lacey and others. Vol. 13, p. 459-466. 25 July 55, 8p. 12 refs. Research rept. on Project NM 005 048.04.19.

DESCRIPTORS: Epidemiology, *Intestines, *Infections, Shigella infections, Salmonella infections, *Disease carriers, Inhibition, Shigella vaccines, Bacterial vaccines, Ships.

During a period of 30 months, bacteriologic and epidemiologic studies were conducted on personnel aboard 21 ships of the Pacific Fleet and included 23,294 officers and men. Of these 15,751 individuals

This is a toxicological study of Cellulube 220, a mixture of triaryl phosphates manufactured for use in hydraulic systems. Such a study was proposed before the general release of this material for shipboard use because of the well known neurotoxic effects of compounds of this nature. Chickens, rabbits, and dogs were administered the material by oral, subcutaneour, respiratory, and percutaneous routes in varying doses. All animals were observed for neuropathies. Changes in blood cholinesterase activity were followed in all rabbits and dogs. Hematological studies on dogs and complete pathological studies on representative groups of all species were done.

Radiobiology

TID-16401 $2.60

Biological Research Lab., Southern Illinois U., Carbondale.
TERMINAL PROGRESS REPORT, on Contract AT(11-1)-424. 14 July 62, 27p. 21 refs.

TID-16122 $2.60

Boston U., Mass.
THE EFFECT OF IRRADIATION ON THE GROWTH AND FUNCTIONING OF TRANSPLANTED OR REGENERATED ADRENOCORTICAL TISSUE IN THE RAT. Progress rept. on Contract AT(30-1)-1254. 30 June 62, 22p.

TID-16060 $6.60

California U., Los Angeles. School of Medicine.
APPLICATIONS OF FUNDAMENTAL BIOLOGY TO THE NEEDS OF MAN. 4. RADIOECOLOGY AND THE STUDY OF ENVIRONMENTAL RADIATION, by William E. Martin. Rept. on Contract AT(04-1)-GEN-12. 8 June 62, 71p. 91 refs.

UCLA-506 $3.60

California U., Los Angeles. School of Medicine.
DISTRIBUTION OF RADIOZINC IN RAT PLASMA, by J. P. Okunewick, O. A. Schjeide and others. Rept. on Contract AT(04-1)-GEN-12. July 62, 32p. 20 refs.

TID-15962 $5.60

Kansas U., Lawrence.
RELATIVE EFFECTIVENESS OF 14 MEV NEUTRONS AND 200 KVP X-RAYS FOR PRODUCTION OF LETHALITY IN GRASSHOPPER EMBRYOS, by Arden E. Bicker. Master's thesis. Preliminary study. May 62, 52p. 13 refs.

TID-15818 $3.60

Massachusetts General Hospital, Boston.
EXTERNAL LOCALIZATION OF FOCAL INTRACRANIAL DISEASE EMPLOYING POSITRON-EMITTING ISOTOPES, by William H. Sweet. Rept. on Contract AT(30-1)-1093. 21 May 62, 33p. 25 refs.

PB 160 073 $2.60

Naval Medical Research Inst., Bethesda, Md.
THE RESPONSE OF TISSUE TO TOTAL BODY IRRADIATION, by John L. Tullis. Rept. no. 11 on Project NM 007 039. 22 July 48, 26p. 14 refs.

DESCRIPTORS: *Tissues (Biology) *Radiation effects, Swine, Ionization X-rays.

The lesions produced in swine by exposure of the total body to ionizing radiations from an atomic bomb explosion are indistinguishable from lesions produced by exposure of the total body to million volt x-irradiation. Lymphoid cells, myeloblasts, erythroblasts, germ cells and intestinal epithelium are found to be quite radiosensitive. Irradiation causes dilatation of capillaries, impairment of circulation, and tissue anoxia. Anemia enhances both lowered resistance to infection and anoxia and thus the pathologic physiology becomes self-perpetuating.

PB 160 444 $1.60

Naval Medical Research Inst., Bethesda, Md.
SULFHYDRYL-CONTAINING AGENTS AND THE EFFECTS OF IONIZING RADIATIONS. I. BENEFICIAL EFFECT OF GLUTATHIONE INJECTION ON X-RAY INDUCED MORTALITY RATE AND WEIGHT LOSS IN MICE, by W. H. Chapman, C. R. Sipe and others. Rept. on Project NM 006 012.08.25 (formerly NM 007 039). 1 Sep 49, 17p. 34 refs.

DESCRIPTORS: *Thiols, Ionization, *Radiation effects, *Glutathione, X-rays, Body weight, Vital statistics, Mice, *Inhibition

A total of 800 Swiss Albino mice (400 males and 400 females) was exposed to a single dose of 800 r (±5%) of total body X-ray radiation. Four hundred mice received glutathione injections before or both before and after irradiation. The four hundred litter mate controls were divided into a group which received control saline injections and a group that received no injections. Weight change data were obtained during the twenty-eight day post-irradiation observation periods. All survivors were then subjected to controlled trauma in a Noble-Collip drum. The irradiated glutathione-treated mice had a survival rate of 63.8 per cent as compared with a survival rate of 43 per cent for the combined controls. The glutathione-treated animals lost less weight during the first fourteen days following irradiation and when traumatized twenty-eight days after irradiation their mortality was less than that of the control animals. (Author)

The anterior descending coronary artery of dogs was temporarily occluded for the insertion of a polyethylene tube. Sudden return of the arterial flow after completion of this intubation was followed by ventricular fibrillation within 20 seconds in 6 of 31 animals. Intermittent release over a period of several minutes was associated with no fatalities in 11 dogs. These observations would seem to justify exercise of caution during the restoration of temporarily interrupted coronary flow in various types of procedures. (Author)

Pharmacology and Toxicology

PB 160 423 $1.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES ON THE ACUTE AND CHRONIC TOXICITY OF METHYL ALCOHOL FOR THE WHITE RAT, by C. H. Hine, W. S. Blakemore and others. Rept. no. 2 on Project NM 007 031.

DESCRIPTORS: *Toxicity, *Methanes, Rats.

The LD_{50} and LD_{90} values of methyl alcohol for young white rats are 15.5 and 18.0 ml/kg. The fractional dose repeated for three days giving an LD_{95} is 9.0 ml/kg. However, rats are able to tolerate 6.0 ml/kg. for a period of thirty days with no untoward effects. There was no significant mortality among rats ingesting five per cent methyl alcohol and rats ingesting five per cent ethyl alcohol with five per cent methyl alcohol for a period of 150 days. Though the fluid intake of both groups was less than that of the control group, the gain in weight of the first group was greater while that of the second was less than normal. The ingestion of ten per cent methyl alcohol caused the death of 80 per cent of rats during a 60-day period.

PB 160 420 $1.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES OF THE TOXIC ACTION OF GALLIUM, by Benjamin F. Lindsley, Katherine E. Henry and others. Rept. on Project NM 007 081.06.08 (formerly NM 011 013). 30 Dec 49, 16p. 8 refs.

DESCRIPTORS: Drugs, *Toxicity, *Gallium, Body weight, Urine, Blood, Body fluids.

Studies of the toxicity of gallium lactate indicate that this compound is much more toxic on a mg. Ga/kg. basis for the larger animal than for smaller species. Studies of the toxicity of gallium citrate with a determination of the toxic limits (LD_{50}, 10 days) indicate that this compound is of the same general toxicity on a mg. Ga/kg. basis, as is the lactate. The citrate is much more soluble and is more stable at pH 7-8, and is generally more satisfactory for subcutaneous or intramuscular injections than is the lactate. Blood and urine studies following subcutaneous injection of acutely toxic doses of Ga citrate produced a decrease of water and food intake and increased urine excretion, with the presence of sugar and albumin in the urine within 24-48 hours. Blood urea nitrogen, non-protein nitrogen, rose to more than double normal levels while blood sugar showed an initial lowering with a subsequent rise. Animals exhibited an uncompensated acidosis due to a marked drop in CO_2 combining power of the blood accompanied by a drop in pH to as low as 7.1. (Author)

PB 160 425 $1.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES ON THE HYPERGLYCEMIC EFFECT OF INSULIN, by Bernard Zimmerman and Thomas J. Donovan. Rept. no. 2 on Project NM 007 026. 25 Mar 48, 17p. 23 refs.

DESCRIPTORS: *Insulin, Blood sugar, *Hyperglycemia, Pancreas, Convulsions, *Ketones, *Acetones.

Experiments were done to investigate the hyperglycemic effects of crystalline and amouphous insulin preparations, to determine their effect on the blood ketone levels of pancreatectomized dogs, and to find out whether the hyperglycemic material could neutralize the action of insulin. Crystalline and amorphous insulin subjected to cysteine inactivation produced very similar hyperglycemic effects in normal dogs. In pancreatectomized dogs, the hyperglycemic effects were slight, and the blood acetone body levels tended to rise during the hyperglycemic phase. The inactivated material showed no ability to protect mice from insulin-induced convulsions.

PB 160 440 $1.60

Naval Medical Research Inst., Bethesda, Md.
A STUDY OF THE DEGRADATION OF CARPAINE TO APOCARPYRINIC ACID HYDROCHLORIDE, by Henry D. Baldridge, Jr. and Henry Rapoport. Vol. 10, p. 1-10. 4 Jan 52, 11p. 4 refs. Research rept. on Project NM 007 081. 13.01.

DESCRIPTORS: Drugs, *Carpaine, *Dehydrogenation, Pyridines, Carboxyl radicals.

Carpaine was dehydrogenated in boiling p-cymene over 5 per cent palladium on charcoal with the evolution of two moles of hydrogen per mole of alkaloid. The resulting compound, which was isolated in the form of its hydrochloride salt, was found to be identical with apocarpyrinic acid hydrochloride.

PB 160 380 $3.60

Naval Medical Research Inst., Bethesda, Md.
THE TOXICOLOGY OF CELLULUBE 220: III. EXPERIMENTAL TOXICOLOGY, by Harry M. Carpenter, Donald J. Jenden and others. Vol. 14, p. 725-760. 22 Oct 56, 36p. 31 refs. Research rept. on Project NM 005 054.01.01.

DESCRIPTORS: *Toxicology, Nervous system, *Paralysis, Cholinesterase, *Phosphates, *Hydraulic fluids

TID-16121 $2.60

Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
EFFECTS OF X-IRRADIATION OF OVARIAN OVA ON THE MORPHOLOGY OF FERTILIZED OVA AND DEVELOPMENT OF EMBRYOS, by E. B. Harvey and M. C. Chang. Rept. on Contract AT(30-1)-1943. 12 July 62, 24p. 23 refs.

TID-16077 $1.60

Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
PROGRESS REPORT, by Gregory Pincus. 1 May 51-30 May 52, on Contract AT(30-1)-919. 18 June 62, 15p. 12 refs.

Surgery

PB 160 385 $1.60

Naval Medical Research Inst., Bethesda, Md.
SECONDARY KIDNEY HOMOTRANSPLANTATION, by Richard H. Egdahl and David M. Hume. Vol. 12, p. 943-952. 13 Dec 55, 11p. 10 refs. Research rept. on Project NM 007 081.21.03.

DESCRIPTORS: Surgery, *Kidneys, *Transplantation, Dogs.

This study was carried out to contrast the principle features of primary and secondary kidney homotransplants. Primary homotransplants were performed in 60 dogs. In 15 pairs of animals, the second kidney from the original donor was transplanted to the original recipient 14 to 86 days after the first transplant had ceased to function and had been removed. The second transplant was placed in a site remote from that used by the first transplant to rule out the factor of local antibody concentration. Renal function was assessed by complete urine collections with daily measurements of specific gravity, urine, urea nitrogen, and protein. On the day the transplant function ceased the kidney was exposed at operation and renal flow was evaluated. The transplant was then removed and examined grossly and microscopically. The secondary kidney transplant secreted urine for a much shorter interval than the primaries in 14 or 15 experiments and in 8 experiments for 1 day or less compared with an average of 5 days for the primary transplants. Microscopically, the primary transplants showed round-cell infiltration as the initial change while the secondaries typically showed tubular necrosis and interstitial hemorrhage. Varying the site of transplantation or the time interval between the two transplantations did not alter the rapid destruction of the secondary homotransplant. (Author)

PB 160 368 $1.60

Naval Medical Research Inst., Bethesda, Md.
A TECHNIQUE FOR SAMPLING LYMPH IN UNANESTHETIZED DOGS BY MEANS OF AN EXTERIORIZED THORACIC DUCT-VENOUS SHUNT, by Crawford S. Brown and Esther Hardenbergh. 18 July 50 11p. 9 refs. Rept. on Project NM 006 012.04.31, formerly NM 007 039.

DESCRIPTORS: Dogs, *Thoracic surgery, Surgery, *Lymph, Collecting methods.

A technique is described for temporarily diverting thoracic duct lymph from the venous circulation by means of exteriorized plastic tubes. The end of the thoracic duct cannula is connected outside the body to the end of a plastic catheter which has been inserted through the proximal communicating vein into the brachio-cephalic vein. Thoracic duct lymph, aided by the flow of blood past the end of the catheter, flows through the connected tube into the brachiocephalic vein. Samples of lymph can be obtained by opening the external connection. Heparin/Pitkin Menstruum is given to diminish clotting hazards. The series consists of 11 dogs, 8 of which ran successfully for from 48 to 144 hours. (Author)

Zoology

PB 160 406 $1.60

Naval Medical Research Inst., Bethesda, Md.
SOME STUDIES ON THE INFLUENCE OF LIGHT ON THE MATING ACTIVITY OF ANOPHELES QUADRIMACULATUS SAY, by Nathan Stahler and Levon A. Terzian. Vol. 13, p. 741-752. 25 Oct 55, 13p. 5 refs. Research rept. on Project NM 005 048.06.07.

DESCRIPTORS: *Insects, *Mosquitoes, Reproduction, Diurnal variations, Photoperiodism

This report, which represents further studies in the laboratory biology of Anopheles quadrimaculatus Say, deals with the effects of natural and artificial illumination and of changes in light intensity, on dirunal mating rhythm and the consequent rates of insemination. (See also PB 160 417)

PB 160 417 $1.60

Naval Medical Research Inst., Bethesda, Md.
STUDIES IN THE LABORATORY MATING HABITS OF ANOPHELES QUADRIMACULATUS SAY, by Nathan Stahler and Levon A. Terzian. Vol. 11, p. 547-556. 11 Mar 53, 11p. 3 refs. Research rept. on Project NM 005 048.06.05.

DESCRIPTORS: *Insects, *Mosquitoes, Reproduction, Diet, Age factors, Population, Test methods.
Studies are being continued on the laboratory biology of the common malaria mosquito, Anopheles quadrimaculatus Say. In this report attention was paid to certain characteristics of the mating habits of this insect. Thus, it has been shown that the age of the mosquitoes, the length of time in cohabitation, the size of the rearing container, and the population density within these containers are among the factors which affect the mating habits of A. quadrimaculatus in the laboratory.

PB 160 445 $1.60

Naval Medical Research Inst., Bethesda, Md.
SULFHYDRYL-CONTAINING AGENTS AND THE EFFECTS OF IONIZING RADIATIONS. II. FURTHER STUDIES OF THE BENEFICIAL EFFECT OF GLUTATHIONE ON X-IRRADIATED MICE, by W. H. Chapman and E. P. Cronkite. Rept. on Project NM 006 012.05.01. 20 June 50, 11p. 8 refs.

DESCRIPTORS: *Thiols, Ionization, *Radiation effects, *Inhibition, *Glutathione, X-rays, Body weight.

The effects of the subcutaneous injection of glutathione prior to irradiation, were studied in four consecutive experiments in which 2343 male, Swiss Albino mice were exposed to various doses of total-body X-radiation. The lethal dose curves for glutathione-injected and non-treated mice were simultaneously determined in each experiment. The 28-day LD_{50} for the non-treated mice was 740 r; for mice that received 1.6 mg. glutathione per gm. of mouse, the 28-day LD_{50} was 840 r, and for mice that received 4.0 mg. glutathione per gm. of mouse, the 28-day LD_{50} was 950 r. These results indicate a quantitative relationship between glutathione dosage and the degree of protection it affords against X-ray damage. Weight change and the effect of trauma were studied in the irradiated survivors in an attempt to demonstrate differences in the recovery rates of the glutathione-injected and the non-treated mice. For these studies, all mice were weighed daily throughout the 28-day observation period of each experiment and on the twenty ninth day all surviving animals were subjected to controlled mechanical trauma produced by a Noble-Collip drum. The glutathione-injected mice lost less weight and were more resistant to trauma than their non-treated controls. (Author)

PB 160 446 $1.60

Naval Medical Research Inst., Bethesda, Md.
SULFHYDRYL-CONTAINING AGENTS AND THE EFFECTS OF IONIZING RADIATIONS. III. STUDIES ON THE MECHANISM OF THE PROTECTIVE ACTION OF GLUTATHIONE, by Eugene P. Cronkite, George Brecher, and W. H. Chapman. Rept. on Project NM 006 012.05.02. 27 June 50, 17p. 23 refs.

DESCRIPTORS: *Thiols, Ionization, *Radiation effects, *Inhibition, *Glutathione, Lymphocytes, Leukocytes, Spleen, Thymus gland, Hemopoiesis.

After injection of reduced glutathione, clearance and tissue distribution studies were performed in mice, dogs, and rats. Animals were irradiated during a period when tissue concentration of reduced glutathione were significantly elevated. Following irradiation of mice with 820 r, granulocytes and lymphocytes were apparently absent from the blood of the untreated mice for a few days. During this same period granulocytes and lymphocytes were seen in small numbers in the blood of glutathione-treated mice. The spleen and thymus of irradiated glutathione-treated mice recover normal weight more rapidly than untreated mice. Histologically, hematopoiesis returns earlier and with greater frequency in the treated mice than the untreated mice. Dogs are also partially protected from radiation by intravenous glutathione, 50 per cent recovering from a dose of radiation that has so far been uniformly fatal to untreated dogs in this laboratory. (Author)

PB 160 382 $1.10

Naval Medical Research Inst., Bethesda, Md.
TRANSFUSION OF SEPARATE LEUKOCYTES INTO IRRADIATED DOGS WITH APLASTIC MARROWS, by George Brecher, K. M. Wilbur (National Inst. of Arthritis and Metabolic Diseases), and E. P. Cronkite. Vol. 11, p. 1145-1152. 20 Oct 53, 8p. 9 refs. Research rept. on Project NM 006 012.05.11; AD-36 245.

DESCRIPTORS: Leukocytes, *Blood transfusions, *Bone marrow, *Radiation injuries, X-rays, Radiation effects, Dogs, Leukopenia.

The causal role of neutropenia in death from radiation injury was studied by observing the effect of concentrated suspensions of homologous white blood cells transfused into irradiated leukopenic dogs. The technique involved (1) the collection of blood from donor dogs with the use of pyrogen-free, siliconed equipment (2) the sedimentation of red blood cells with dextran, and (3) the preparation of concentrated suspensions of white blood cells and platelets by differential centrifugation of the plasma. The method was not successful in maintaining a normal level of circulating white blood cells by daily transfusion of the freshly separated cells; at best only 30% of the transfused cells circulated. No granulocytes were found in lung sections of 2 dogs killed within an hr of transfusion. However, the sinuses of many lymph nodes contained granulocytes, which suggested the possible role of lymph nodes in the rapid removal of transfused leukocytes. Normal function of transfused cells was indicated by the formation of purulent tonsillar exudates, purulent follicultis, or skin abscesses in dogs with complete marrow aplasia.

UR-612 $1.60

Rochester U. School of Medicine and Dentistry, N. Y.
RESEARCH DIRECTED TOWARD THE USE OF I^{131} LABELED FIBRINOGEN AND ANTIBODY TO FIBRIN IN THE LOCALIZATION AND TREATMENT OF TUMORS, by William F. Bale, Irving L. Spar and Ruth L. Goodland. Rept. on Contract W-7501-eng-49. 20 July 62, 16p. 10 refs.

TID-16164 $2.60

St. Olaf Coll., Northfield, Minn.
THE IN VITRO UPTAKE AND DISTRIBUTION OF RADIOGLUCOSE BY A FROG LUNG-FLUKE (HAEMATOLOECHUS MEDIOPLEXUS) AND A CORRELATION WITH HISTOCHEMICAL STUDIES ON GLYCOGEN, by Paul R. Burton. Rept. on Contract AT(11-1)-1016 and NSF Grant G 17657. [1961] 24p. 17 refs.

TID-16392 $3.60

Institute of Metals and Explosives Research, U. of Utah, Salt Lake City.
A STUDY OF OXYGEN SOLUBILITY IN WATER AND THORIA SLURRIES AT ELEVATED PRESSURES AND TEMPERATURES, by Monte B. Shirts and Milton E. Wadsworth. Technical rept. no. 24 on Contract W-7405-eng-26. Nov 61, 33p. 7 refs.

TID-15827 $1.60

Maine U., Orono.
ELECTROLYTIC SOLUTIONS, by Jerry Braunstein. Annual progress rept. 1 Sep 61-1 May 62, on Contract AT(30-1)-2873. 1 May 62, 19p. 14 refs.

TID-16400 $2.60

Michigan U., Ann Arbor.
THERMOPHYSICAL PROPERTIES OF THE LANTHANIDE OXIDES. II. HEAT CAPACITIES, THERMODYNAMIC PROPERTIES, AND SOME ENERGY LEVELS OF SAMARIUM(III), GADOLINIUM(III), AND YTTERBIUM(III) OXIDES FROM 10 TO 350°K, by Bruce H. Justice and Edgar F. Westrum, Jr. Oct 60, 30p. 28 refs.

ORNL-3273 $1.60

Oak Ridge National Lab., Tenn.
SEPARATION OF TRANSPLUTONIUM ELEMENTS BY PHOSPHONATE EXTRACTION, by R. D. Baybarz. Rept. on Contract W-7405-eng-26. 3 Aug 62, 14p. 10 refs.

TID-16120 $1.60

Polytechnic Inst. of Brooklyn, N. Y.
COMPLEX ION FORMATION IN FUSED SALTS, by Reed F. Riley. Annual progress rept. 1 June 61-31 May 62, on Contract AT(30-1)-2747. 26 June 62, 13p. 4 refs.

EARTH SCIENCES

Order from GPO $0.45 as
I 53.17:P96.

Bureau of Land Management, Dept. of the Interior, Washington, D. C.
PUBLIC LANDS BIBLIOGRAPHY. 1962, 109p. 1288 refs.

DESCRIPTORS: *Bibliography, Literature, Geography, Economics.

Order from GPO $0.20 as
C 4.41/2:19

Coast and Geodetic Survey, Washington, D. C.
ANALYTIC ABSOLUTE ORIENTATION IN PHOTOGRAMMETRY, by G. C. Tewinkel. Mar 62, 30p. 10 refs. Technical bulletin no. 19.

DESCRIPTORS: *Aerial photography, Photography, *Mapping, Numerical analysis, Digital computers, Programming, *Geodetic data.

An absolute orientation is described based entirely on numerical data. Included are the development of the mathematics of the problem and a suggested program for an electronic computer. The choice of the iterative method may seem at first to be awkward or unnecessary, but experience gained with the relative orientation problem has instilled confidence in the speed and applicability of the system.

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Coast and Geodetic Survey, Washington, D. C.
SURFACE WATER TEMPERATURE AND SALINITY, PACIFIC COAST, NORTH AND SOUTH AMERICA AND PACIFIC OCEAN ISLANDS. First ed. 1962, 74p. Publication 31-3, supersedes Special publication 280 and Publication 31-4.

DESCRIPTORS: Sea water, Temperature, Salinity, Pacific Ocean, Pacific Islands, *Oceanographical data.

AD-274 825 repriced $9.00

Missouri School of Mines and Metallurgy, Rolla.
GEOLOGIC STRUCTURE STABILITY AND DEEP PROTECTION CONSTRUCTION, by G. B. Clark and R. D. Caudle. Rpet. on Contract AF 29(601)2821. Nov 61, 613p. 416 refs. AFSWC-TDR-61-93.

DESCRIPTORS: *Underground structures, *Shelters, Safety, Stability, *Geology, Physical properties, Mechanical properties, Failure (Mechanics), *Rocks, Soils, *Geological survey for Underground structures, Stresses, *Mining engineering, Design, Mathematical analysis, Construction, Engineering, Structures, *Geophysical prospecting, Theory, Test methods, *Shock waves, *Seismic waves, Propagation, Attenuation, Measurement, Instrumentation, Nuclear explosions.

A study is made of the problems associated with protective construction in rock, particularly deep protective structures. Information from the experience of mining engineers and from past weapons tests is given on rock structure and properties and on theories relating these to the stability of underground openings under both static and dynamic loads. Recommendations are made for meeting design problems for underground protective structures and for research to improve the reliability of the designs. (Author)

CHEMISTRY

TID-16332 $2.60

Connecticut U., Storrs.
ANALYTICAL CHEMISTRY AT LOW CONCENTRATIONS, by John T. Stock. Annual rept. no. 6 on Contract AT(30-1)-1977. 28 July 62, 19p. 10 refs.

Organic Chemistry

TID-16028 $2.60

Buffalo U., N. Y.
DISSOCIATION OF METHACRYLIC ACID RESINS, by Amalesh Chatterjee and Jacob A. Marinsky. Rept. on Contract AT(30-1)-2269. 13 June 62, 22p. 33 refs.

TID-16029 $1.60

Buffalo U., N. Y.
A THERMODYNAMIC INTERPRETATION OF THE OSMOTIC PROPERTIES OF CROSS-LINKED POLYMETHACRYLIC ACID, by Jacob A. Marinsky and Amalesh Chatterjee. Rept. on Contract AT(30-1)-2269. 13p. 11 refs.

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I 28.3:600

Bureau of Mines, Washington, D. C.
THE CHEMISTRY AND CATALYTIC PROPERTIES OF COBALT AND IRON CARBONYLS, by Irving Wender, Heinz W. Sternberg, and others. 1962, 87p. 163 refs. Bulletin 600.

DESCRIPTORS: *Fuels, *Metalorganic compounds, *Cobalt catalysts, *Iron catalysts, *Carbonyl radicals, Atomic number, Chemical bonds, Spectrographic analysis, Resonance absorption, Chemical reactions, Dissociation, Hydrogenation, Polymerization, Reaction kinetics, Complex compounds, Thermodynamics

TID-16048 $8.10

Delaware U., Newark.
THE REARRANGEMENT OF ALLOXAN AND ITS DERIVATIVES, by Richard W. Spayd. Doctoral thesis. June 62, 83p. 53 refs.

PB 160 078 $1.60

Naval Medical Research Inst., Bethesda, Md.
REVERSIBLE ASSOCIATION PROCESSES OF GLOBULAR PROTEINS. VII. THE REVERSIBLE DIMERIZATION OF CHYMOTRYPSIN, by Robert F. Steiner. Vol. 12, p. 601-618. 8 Dec 54, 19p. 11 refs. Research rept. on Project NM 000 018.06.31

DESCRIPTORS: *Molecular association, *Plasma proteins, Enthalpy, Entropy, Temperature, Hydrogen ion concentration, *Chymotrypsin, *Isomeric transitions.

The association of α-chymotrypsin has been studied as a function of pH or ionic strength, and temperature. Association is favored by decreasing the pH or increasing the ionic strength. Electrostatic effects, while significant, apparently do not play a dominant role. The enthalpy of association is very small. (Author)

PB 160 916 $3.60

Tennessee Agricultural and Industrial State U., Nashville.
PREPARATION AND PROPERTIES OF ORGANIC DERIVATIVES OF TIN HYDRIDES, by C. R. Dillard, E. E. Holmes and others. Final rept. on Contract N9onr-95700. 31 Aug 52, 35p. 26 refs. AD-6418.

DESCRIPTORS: *Metalorganic compounds, *Tin compounds, *Hydrides, Preparation, Chemical properties, *Thermochemistry, Combustion, Heat of formation, Chemical bonds.

Thermochemical studies of organo-tin compounds were made to obtain data for the calculation of bond energies and electronegativity of the metal. The heats of combustion were -934±2.8, -1547±1.5, -2816±3.9, -3182±1.8, and -4060±3.2, for Me_4Sn, Et_4Sn, Bu_4Sn, Ph_4Sn, and tetrahexyl tin, respectively. Heats of formation calculated from these data are also presented. Calculations of the Sn-C bond energies from Pauling's empirical values of single-bond energies and heats of atomization indicated that the bond energies in the organo-tin molecules were additive and that the Sn-C bond energy had a reasonably constant value of about 25 kg-cal/mole. The spectrograms of 6 symmetrically substituted alkyl stannanes were studied. Preliminary frequency assignments are listed for the stretching and deformation vibrations of the C-H bond. No skeletal vibrations appeared in the 2- to 16-u spectral range. Unsuccessful attempts made to prepare chloroethyl stannanes by the methods used to prepare analogous Si compounds indicated a difference in bond type.

Physical Chemistry

NASA N62-14369 $4.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
CATALYSIS OF RECOMBINATION IN NONEQUILIBRIUM NOZZLE FLOWS, by A. Q. Eschenroeder and J. A. Lordi. Rept. on Contract NASr-109. Aug 62, 45p. 26 refs.

For presentation at the Ninth International Symposium on Combustion, Ithaca, N. Y., Aug 62.

assurance have been suggested. The possibilities of obtaining satisfactory tropical and arctic night-flight balloons by suitable compound design and balloon pretreatment have been demonstrated. The potential of tabular balloons to provide faster rates of ascent has been shown. A means of preconditioning in the field with an electric heating mantle which uses no water has been developed. (Author)

NASA N62-14286 $7.60

Meteorological Satellite Lab., Weather Bureau, Washington, D. C.
IDENTIFICATION OF CLOUDFORMS FROM TIROS I PICTURES, by Carl O. Erickson and Lester F. Hubert. June 61, 72p. 41 refs. MSL rept. no. 7.

Geography

PB 160 929 $1.60

[California U., Berkeley].
MARINE AND STREAM TERRACES OF THE SOUTHEAST COSTAL PLAIN OF THE DOMINICAN REPUBLIC, by Ward Barrett. Preliminary rept. on Contract Nonr-22211. [1955] 19p. AD-83 947.

DESCRIPTORS: *Geography, *Geology, Oceanography, Military intelligence, *Dominican Republic.

The reef and its facies, marine and shore features, and marine and river terraces are described. Geographical and geological literature concerning the area is reviewed from 1872 to the present.

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C 4.41/2:18

Coast and Geodetic Survey, Washington, D. C.
SUBMARINE PHYSIOGRAPHY OF THE U.S. CONTINENTAL MARGINS, by G. F. Jordan. Mar 62, 30p. 30 refs. Technical bulletin no. 18.

DESCRIPTORS: *Submarines, *Geography.

A general picture is presented with representative and contrasting details of the submarine physiography of the Atlantic, Gulf, and Pacific margins of the continental United States. (Author)

Geology

Order from GPO $0.30 as
I 28.3:599

Bureau of Mines, Washington, D. C.
RELATIVE PERMEABILITY STUDIES: GAS-OIL AND WATER-OIL SYSTEMS, by A. G. Loomis and D. C. Crowell. 1962, 43p. 68 refs. Bulletin 599.

DESCRIPTORS: *Geophysics, *Gases, *Oils, *Water, Permeability, Dynamics, Phase studies, Test equipment, Mathematical analysis.

Order from GPO $1.50 as
I 19.3:1063-C

Geological Survey, Washington, D. C.
GEOLOGIC ENVIRONMENT OF AN OXIDIZED URANIUM DEPOSIT IN THE BLACK HILLS, SOUTH DAKOTA. GEOLOGY AND URANIUM DEPOSITS IN SOUTHERN BLACK HILLS, by N. P. Cuppels. 1962, 31p. 14 refs. Geological Survey bulletin 1063-C.

DESCRIPTORS: *Geology, *Ores, *Uranium, Deposits, Geochemistry, Minerals, South Dakota.

One of the largest oxidized deposits of uranium in the Black Hills is at the Gould mine in Fall River County, S. Dak. The mine is on the dip slope of the Lower Cretaceous Inyan Kara group of fluviatile sedimentary rocks that form a hogback peripheral to the Black Hills. The deposit consists of a concentration of hydrated uranium vanadates distributed irregularly through a zone 1 to 15 feet thick near the middle of a thick sandstone unit of the Lakota formation. The eastward-trending zone is 800 feet long and 130 feet wide. The top boundary of the zone is roughly parallel with, and several feet below, an unconformity at the base of a silt-gall conglomerate. Geochemical data suggest that the deposit is a product of the oxidation and local redistribution of an ancestral low-valent ore body. Comingling of solutions beneath the conglomerate may have been the primary control in localizing the ore. The distribution of uranium within the ore zone has been controlled by fractures and differential permeability within the host rocks. (Author)

Order from GPO $1.50 as
I 19.16:389

Geological Survey, Washington, D. C.
GEOLOGY AND COAL RESOURCES OF THE CEDAR MOUNTAIN QUADRANGLE, IRON COUNTY, UTAH, by Paul Averitt. 1962, 79p. 92 refs. Geological Survey Professional Paper 389.

DESCRIPTORS: *Geology, Geological survey, *Coal, Coal mines, Mountains, *Utah.

A study of the Hurricane Cliffs and the Kolob Terrace in the southern part of the historic Cedar City coal field.

Order from GPO $3.50 as
I 19.16:342

Geological Survey, Washington, D. C.
GEOLOGY AND ORE DEPOSITS OF THE GLOBE-MIAMI DISTRICT, ARIZONA, by N. P. Peterson. 1962, 163p. 46 refs. Geological Survey Professional Paper 342.

DESCRIPTORS: *Geology, Geological survey, *Ores, Deposits, *Minerals, Copper, Mines, *Arizona.

PB 160 439 $1.60

Naval Medical Research Inst., Bethesda, Md.
THE STUDY OF FROZEN SPECIMENS, ICE CRYSTALS AND ICE CRYSTAL GROWTH BY ELECTRON MICROSCOPY, by H. T. Meryman and E. Kafig. Vol. 13, p. 529-544. 16 Aug 55, 17p. 9 refs. Research rept. on Project NM 000 018.01.09.

DESCRIPTORS: *Ice, Crystals, Growth, Crystal structure, Microanalysis, *Electron microscopy.

A technique for the electron microscopy of frozen liquids by vacuum evaporated replication has been devised. It permits the study of both surfaces and fracture planes with and without heat etching for further crystallographic detail. Examples of such replicas of frozen water, ice, and other frozen liquids are shown and discussed. The technique has also been extended to the replication of frozen biological materials. In these studies, although gross morphology was retained, the granular structure of the frozen layer of water adsorbed to hydrated materials obscured fine detail. Electron microscopical studies were also made of the growth of ice crystals from glassy films at very low temperature. The rapid development of large ice crystals at temperatures near -100°C. is demonstrated and its significance in storage and freeze-drying discussed. (Author)

NASA N62-15038 $1.60

Rand Corp., Santa Monica, Calif.
A NOTE ON THE COMPRESSION OF THE EARTH'S MAGNETIC FIELD AND HYPOTHETICALLY RELATED PHENOMENA, by L. R. Henrich. Rept. on Contract NASr-21(05). Aug 62, 16p. 10 refs. Memo. RM-3277-NASA.

Climatology and Meteorology

PB 162 056 $1.10

[Air Weather Service, Washington, D. C.]
AN OBJECTIVE METHOD FOR FORECASTING MINIMUM TEMPERATURES, APRIL THROUGH SEPTEMBER, AT LADD AIR FORCE BASE, by Joseph K. Slater, Jr. [1959] 5p. AD-226 510.

DESCRIPTORS: *Weather forecasting, *Temperature, Meteorological data, Errors, Air force, Military facilities, *Alaska.

PB 162 055 $1.10

Air Weather Service, Washington, D. C.
OBJECTIVE TECHNIQUE FOR FORECASTING SNOW SHOWERS AT MISAWA AIR FORCE BASE. 25 Feb 59, 10p. AD-227 452.

DESCRIPTORS: *Weather forecasting, *Snow, Visibility, Meteorology, Air force, Military facilities, *Japan.

The occurrence of snow showers which can drastically reduce the ceiling and visibility is the major wintertime forecasting problem at Misawa Air Base. Study is made to devise an objective forecasting technique which should be capable of: (1) a yes or no forecast of snow showers during the next 12 hours, (2) a forecast of the intensity of the snow showers as expressed by restrictions to the ceiling and visibility and (3) A forecast of the frequency of the snow showers. (Author)

PB 162 049 $8.10

Air Weather Service, Scott AFB, Ill.
WIND VARIABILITY, by Hugh W. Ellsaesser. 10 Mar 60, 90p. 92 refs. AWS TR-105-2; AD-242 199.

DESCRIPTORS: *Wind, *Weather forecasting, Measurement.

Available sources of data on wind variability for periods of one hour to several days are reviewed, evaluated, and compared. The best of the data are summarized in graphical and tabular form. The dependence of the variability with region, season, altitude, time period, synoptic conditions, and method of measurement, is systematically covered. Statistical methods for representing variability, accuracy of the data, and causes of variability are also discussed. Finally, some of the past studies on applications of variability data in forecasting and operational problems are reviewed. Appendix I provides guidance on how to apply the information in this report to practical problems in the field, and gives several sample problems with answers worked out. (Author)

PB 162 038 $21.00

Kaysam Corp. of America, Paterson, N. J.
STUDY OF PHYSICAL CHARACTERISTICS OF BALLOONS AND BALLOON MATERIALS, by Eric Nelson. Final rept. 1 Nov 58-31 Dec 59, on Contract DA 36-039-sc-78239. [1960] 359p. AD-234 572.

DESCRIPTORS: *Meteorological balloons, Elastomers, *Physical properties, *Materials, Flight testing, Aerodynamics, Preparation, Processing, Radiation effects, Films, Infrared radiation.

Compounds have been developed which produce consistent 100,000-foot, day-flight balloons. Compounds have been developed which produce consistent 100,000 foot, dual-purpose balloons. Balloons capable of reaching 120,000 feet by day and weighing approximately 2500 grams have been made. Balloons capable of reaching 120,000 feet by night and weighing 2500 grams to 3000 grams have been made. Balloons capable of reaching 140,000 feet by day and weighing approximately 6000 grams have been produced. Compounds have been developed which produce spherical balloons capable of reaching 100,000 feet at 1700 feet per minute. Improvements in oxygen bomb aging and ozone resistance have been achieved. The effect of infra-red radiation and pre-elongation on balloon films has been established. Improvements in balloon specifications designed to result in better quality

Seismology

NASA N62-15117 $4.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE LUNAR SEISMOGRAPH EXPERIMENT: RANGER 3, 4, 5, by D. F. Adamski. Rept. on Contract NAS7-100. 1 June 62, 41p. 8 refs. Technical rept. no. 32-272.

NASA N62-15115 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LUNAR SEISMOLOGY, by R. L. Kovach and F. Press. Rept. on Contracts NAS7-100 and NASw-81. 10 Aug 62, 15p. 19 refs. Technical rept. no. 32-328.

ENGINEERING

PB 162 059 $8.60

Dynamic Analysis and Control Lab., Mass. Inst. of Tech., Cambridge.
BASIC RESEARCH AND DEVELOPMENT IN FLUID POWER CONTROL FOR THE UNITED STATES AIR FORCE. Progress rept. no. 5 on Contract AF 33(616)6120. Nov 60, 96p. 13 refs. WADD TR-60-790; AD-250 267.

DESCRIPTORS: *Hydraulic systems, *Pneumatic systems, *Control systems, Gas generating systems, Servomotors, Gas bearings, Jets, *Pneumatic servomechanisms, Pneumatic valves, Servo systems, Hydraulic servomechanisms, *Hydraulic power systems, Tests, Design, Control valves.

Research and development is continuing on problems associated with high performance hydraulic and pneumatic control equipment for advanced systems. Increased emphasis on high pressure pneumatic components and systems reflects the approach to an ultimate objective of employing hot gas power to operate such systems. Control valves, servomotors, gas bearings, fluid power and signal transmission, hot-gas contamination, techniques of control are the major items discussed. (Author) (See also PB 156 640)

ORNL-TM-278 $3.60

Oak Ridge National Lab., Tenn.
PERSONNEL-EXPOSURE AND CONTAMINATION CONTROL IN THE ROUTINE OPERATION OF THE ORNL RESEARCH REACTORS, by T. M. Sims. Rept. on Contract W-7405-eng-26. 31 July 62, 35p. 6 refs.

PB 160 918 $5.60

Rosemount [Aeronautical] Labs., U. of Minnesota, Minneapolis.
THE BAROMETER AND THE MANOMETER IN PRESSURE MEASUREMENTS, by J. J. Sheppard, Jr. [Rept. on Contract AF 18(600)384] 30 Jan 53, 57p. 12 refs. Engineering memo. no. 24; AD-17 892.

DESCRIPTORS: *Pressure, Measurement, *Manometers, *Barometers, Construction, Calibration, Errors, Tables.

The construction and calibration of the Fortin-type mercurial barometer are described, and consideration is given to the following sources of error: defective vacuum space, capillary action, instrumental or scale error, reading of the barometer, verticality, effect of a wind, position of barometer, and accuracy and permanence. A discussion of the simple U-tube manometer emphasizes the construction materials and liquids.

Aeronautical Engineering

PB 160 917 $5.60

Air Force Flight Test Center, Edwards AFB, Calif.
LABORATORY ENVIRONMENTAL TESTING OF THREE AIRBORNE MAGNETIC RECORDERS, by John M. Magida and Edwin K. Brown. 30 Apr 56, 51p. Technical memo no. FTFF-TM-56-18; AD-115 588.

DESCRIPTORS: Airborne, *Magnetic recording systems, Magnetic tape, Tests.

Laboratory environmental tests are discussed for 3 airborne magnetic recorders and their associated components (exclusive of transducers and modulating components normally required for a complete data acquisition system). The systems included (1) the Ampex Corporation model 814; (2) the Consolidated Electrodynamic Corporation Datatape System; and (3) the Davies Laboratories Inc. model 545-D portable tape recording system. The tests performed on the 3 systems were identical, as well as simultaneous whenever in Mil-E-5400 were followed. In instances where these specifications were exceeded, they were based on more realistic conditions actually encountered in experimental flight testing. The units generally exceeded the manufacturers claims. The magnetic tape portion of an airborne data acquisition system was concluded to be dependable in providing a highly reliable and accurate means of recording flight data.

PB 162 048 $21.00

Lockheed Aircraft Corp., Burbank, Calif.
DEVELOPMENT OF AN EJECTABLE-NOSE ESCAPE CAPSULE, by E. A. Newquist, M. D. Cassidy, and others. Rept. on Contract AF 33(600)35430. June 59, 356p. 21 refs. WADC Technical rept. 59-493; AD-241 590.

Within the district of known productive deposits are several large areas underlain by rocks that are younger than the period of mineralization and that may conceal other ore bodies.

Order from GPO $0.55 as
I 19.13:1475-J

Geological Survey, Washington, D. C.
GROUND WATER IN THE WUPATKI AND SUNSET CRATER NATIONAL MONUMENTS, COCONINO COUNTY, ARIZONA. HYDROLOGY OF THE PUBLIC DOMAIN, by Oliver J. Cosner. 1962, 15p. 8 refs. Geological Survey Water-Supply paper 1475-J.

DESCRIPTORS: *Hydrology, *Geological survey, *Arizona, Terrain, *Maps.

The Wupatki and Sunset Crater National Monuments are 15 and 30 miles, respectively, northeast of Flagstaff on the San Francisco Plateau. They are in the eastern part of the San Francisco volcanic field and on the southwest flank of the Black Mesa basin. The Supai formation, Coconino sandstone, Kaibab limestone, Moenkopi formation, and Chinle formation are overlain in parts of the area by volcanic rocks and alluvium. The regional water table occurs chiefly in the Coconino sandstone at altitudes of about 5,000 feet at Sunset Crater, about 4,075 feet near Wupatki Ruin, and about 4,100 feet near Citadel Ruin. The general movement of the ground water is northeastward.

Order from GPO $2.50 as
I 19.16:344-A

Geological Survey, Washington, D. C.
METASOMATIC METAMORPHISM IN WESTERN CLEARWATER COUNTY, IDAHO. METAMORPHIC AND IGNEOUS ROCKS ALONG THE NORTHWEST BORDER ZONE OF THE IDAHO BATHOLITE, by Anna Hietanen. 1962, 27p. 69 refs. Geological Survey Professional Paper 344-A.

DESCRIPTORS: *Geology, Geological survey, *Petrology, Rock, *Idaho.

Petrologic study of the inner contact aureole of the Idaho batholith.

Order from GPO $4.00 as
I 19.16:324

Geological Survey, Washington, D. C.
QUATERNARY STRATIGRAPHY OF THE LA SAL MOUNTAINS, UTAH, by Gerald M. Richmond. 1962, 145p. 91 refs. Geological Survey Professional Paper 324.

DESCRIPTORS: *Geology, Geological survey, Soils, Mountains, *Utah.

Mineralogy

Order from GPO $0.10 as
I 28.37/a:G767/961

Bureau of Mines, Washington, D. C.
GRAPHITE, by Harold J. Drake and Betty Ann Brett. [1962] 11p. 25 refs.

DESCRIPTORS: Minerals, *Graphite, Production consumption, Distribution, Chemical engineering.

Preprint from Bureau of Mines Minerals Yearbook, v. 1, 1961

Order from GPO $0.05 as
I 28.37/a:K98/961

Bureau of Mines, Washington, D. C.
KYANITE AND RELATED MINERALS, by James D. Cooper and Gertrude E. Tucker. [1962] 8p. 13 refs.

DESCRIPTORS: *Minerals, *Aluminum compounds, *Silicates, *Mullite, Production, Consumption, Distribution, Chemical engineering.

Preprint from Bureau of Mines Minerals Yearbook, v. 1, 1961

Order from GPO $0.10 as
I 28.37/a:V26/961

Bureau of Mines, Washington, D. C.
VANADIUM, by Richard F. Stevens, Jr. and Claudia V. Davis. [1962] 11p. 26 refs.

DESCRIPTORS: Minerals, *Vanadium, Production, Consumption, Distribution, Chemical engineering.

Preprint from Bureau of Mines Minerals Yearbook, v. 1, 1961

Order from GPO $0.10
I 28.37/a:Z68/961

Bureau of Mines, Washington, D. C.
ZIRCONIUM AND HAFNIUM, by F. W. Wessel. [1962] 9p. 14 refs.

DESCRIPTORS: Minerals, *Zirconium, *Hafnium, Production, Consumption, Chemical engineering.

Preprint from Bureau of Mines Minerals Yearbook, v. 1, 1961

TEI-816 $3.60

Geological Survey, Washington, D. C.
THERMODYNAMIC PROPERTIES OF MINERALS, by Richard A. Robie. Apr 62, 33p. 94 refs.

PB 160 930 $2.60

Armour Research Foundation, Chicago, Ill.
VERY HIGH FREQUENCY CRYSTAL OSCILLATOR CIRCUITS, by H. E. Gruen. Quarterly progress rept. no. 1 on Contract DA 36-039-sc-64609. 15 Aug 55, 23p. AD-75 673.

DESCRIPTORS: Very high frequency, *Crystal oscillators, *Oscillator circuits, Radiofrequency oscillators.

The results of a survey to determine the most promising crystal oscillator circuits for use at frequencies of 75 to 150 megacycles are reported. Basic information on twelve circuit types is compiled and from this several circuits are selected for further investigation. Included are the Grounded Grid, Cathode Coupled, and Transformer Coupled oscillator circuits. Further information is to be obtained on two additional circuits: the Bridged 'T' and the high frequency Colpitts. The most promising circuits from this group are to be developed into usable, practical circuits, and a method for their design is to be developed. A discussion of VHF crystal performance and methods of crystal parameter measurement are also included. (Author)

PB 162 107 $10.50

Army Signal Research and Development Lab., Fort Monmouth, N. J.
FUEL CELLS, by Herbert H. Hunger, Fritz R. Franke, and John J. Murphy. Status rept. no. 3, 1 June 62, 133p. 58 refs.

DESCRIPTORS: *Batteries & components, *Fuel cells, Electrochemistry, *Energy conversion, Scientific research, *Patents.

Work on fuel cells performed under U. S. Government Laboratory programs and under U. S. Government supported contracts is summarized. Publications of an important nature pertinent to fuel cell research and development are reviewed in the chapter entitled "Recent Sources of Information on Fuel Cells." A fuel cell glossary and a survey of U. S. and foreign patents on fuel cells are presented in the appendix. (See also PB 171 155)

PB 160 955 $1.10

Battelle Memorial Inst., Columbus, Ohio.
THERMOELECTRIC POWER GENERATION AND RELATED PHENOMENA, by T. S. Shilliday. Bimonthly progress rept. no. 2, 7 Jan-7 Mar 59, on Contract NObs-77034. 15 Apr 59, 5p. 1 ref.

DESCRIPTORS: *Thermoelectricity, Electric power production, *Thermoelectric generators, Materials, Bismuth compounds, Antimony compounds, Tellurides, Selenides, Alloys.

Work on thermoelectric materials for use in generator studies yielded a number of ingots of Bi_2Te_3 alloyed with Sb_2Te_3 and with Bi_2Se_3, the parameters of some of which were measured.

PB 160 956 $1.10

Battelle Memorial Inst., Columbus, Ohio.
THERMOELECTRIC POWER GENERATION AND RELATED PHENOMENA, by T. S. Shilliday. Bimonthly progress rept. no. 3, 7 Mar-7 May 59, on Contract NObs-77034. 5 June 59, 10p. 4 refs.

DESCRIPTORS: *Thermoelectricity, Electric power production, *Thermoelectric generators, Materials, Bismuth compounds, Tellurides, Selenides, Alloys, Preparation, Electrical properties, Thermal conductivity.

The thermoelectric properties of specimens of n-type Bi_2Te_3-Bi_2Se_3 alloys, containing 33.3 and 50 mole per cent Bi_2Se_3, respectively, were measured as a function of temperature. The 66.7 Bi_2Te_3-33.3 Bi_2Se_3 alloy shows some promise for operation in the temperature region near 450°K. Two small-diameter rods (15 mm x 5 mm) of Bi_2Te_3-Bi_2Se_3 alloys (50 and 33.3 per cent selenide) were prepared by the quench and anneal technique. Differential thermal analysis (D. T. A.) was used to determine the effects of annealing on the procurement of a homogeneous alloy phase of the composition, 75 Bi_2Te_3-25 Bi_2Se_3 (mole per cent). (See also PB 160 955)

PB 160 958 $1.10

Battelle Memorial Inst., Columbus, Ohio.
THERMOELECTRIC POWER GENERATION AND RELATED PHENOMENA, by T. S. Shilliday. Bimonthly rept. no. 5, 7 July-7 Sep 59, on Contract NObs-77034. 20 Oct 59, 10p. 4 refs.

DESCRIPTORS: *Thermoelectricity, Electric power production, *Thermoelectric generators, Materials, Aluminum compounds, Gallium compounds, Arsenides, Alloys, Preparation, Electrical properties, Physical properties.

The experimental work on preparing AlAs is continuing, and a variety of methods for the preparation of AlAs-GaAs alloys have been undertaken. Construction is under way on an apparatus for electrical measurements at high temperatures, as well as an arrangement for high-temperature thermal-diffusivity measurements. Investigations of the effects of boundary conditions on the expressions for the galvano- and thermomagnetic coefficients are continuing in the fundamental-properties portion of the work. (Author) (See also PB 160 957)

PB 160 957 $1.60

Battelle Memorial Inst., Columbus, Ohio.
THERMOELECTRIC POWER GENERATION AND RELATED PHENOMENA, by T. S. Shilliday. Bimonthly rept. no. 4, 7 May-7 July 59, on Contract NObs-77034. 24 Aug 59, 12p. 11 refs.

DESCRIPTORS: Ejection, *Airplane noses, Aircraft cabins, *Cockpits, *Jettisonable cockpits, Acceleration tolerance, Separation, Stabilization, Anoxia, Pressure suits, Carbon compounds, Dioxides.

This report presents the results of a study to develop the optimum ejectable-nose escape capsule for use in single place high performance type aircraft. The capsule will provide safe escape throughout the speed range from zero to 900 knots EAS or a Mach number of 4 whichever is lower, and an altitude range from sea level to 100,000 feet. A description of the capsule construction and the devices necessary for stabilization, separation, deceleration, descent, and alighting is given. Trajectories of the capsule and fuselage afterbody are plotted and the accelerations on the pilot are shown for the most critical case and compared to human limits. Environment problems such as pressure loss, oxygen deficiency, and carbon dioxide accumulations after separation are discussed along with the problems of surviving in extreme heat and cold on the ocean or on land. The weight requirement is estimated and compared to a current escape seat system and a super escape seat and pressure suit assumed capable of escape at the speeds and altitudes for which the capsule is designed. Volume requirements are also calculated. (Author)

NASA N62-15044 $2.60

Massachusetts Inst. of Tech., Cambridge.
A ROTARY-DRIVE, VIBRATORY-OUTPUT GYROSCOPIC INSTRUMENT, by George C. Newton, Jr. Rept. on Grant NsG-149-61. [1962] 22p. 9 refs.

PB 162 161 $5.60

Matrix Corp., Arlington, Va.
A BIBLIOGRAPHY FOR TERMINAL AREA AIR TRAFFIC CONTROL SYSTEM DESIGN, by James W. Danaher and Paul W. Bradbury (Federal Aviation Agency). Rept. on Contract FAA/BRD-301. 30 June 62, 60p. 144 refs. Matrix rept. 62-9-U.

DESCRIPTORS: *Air traffic control systems, Design, Air traffic control, Simulation, Abstracting, *Bibliography.

The purpose of this task was to perform a literature search and to generate an annotated bibliography pertaining to terminal area air traffic control configurations, procedures and equipments, with particular emphasis on the results obtained through the use of simulation techniques.

NASA N62-14225 $12.50

National Aeronautics and Space Administration, Washington, D. C.
FEDERAL AVIATION AGENCY AND NATIONAL AERONAUTICS AND SPACE ADMINISTRATION JOINT TECHNICAL CONFERENCE ON SLUSH DRAG AND BRAKING PROBLEMS, DEPARTMENTAL AUDITORIUM, WASHINGTON, D. C., DECEMBER 19-20, 1961. A compilation of the papers presented. [1961] 175p. 21 refs.

PB 162 023-2 $8.10

Rosemount Aeronautical Labs., U. of Minnesota, Minneapolis.
AN EXPERIMENTAL INVESTIGATION OF THE USE OF HOT GAS EJECTORS FOR BOUNDARY LAYER CONTROL, by Richard V. De Leo and Richard D. Wood. Rept. on Contract AF 33(038)5131. Dec 53, 87p. 24 refs. WADC Technical rept. 52-128, Part 2; AD-54 379.

DESCRIPTORS: *Boundary layer control, Exhaust gas ejectors, Supersonic nozzles, Temperature, Pressure, Experimental data.

The primary purpose of Phase II of the ejector study has been to provide experimental data for engineering design purposes. The geometric and state parameters of the ejector were investigated over a wide range, both with and without diffuser. Variation in the ejector performance was determined for a change in primary temperature, and the effect of the use of a supersonic primary nozzle was also investigated. Comparisons of theoretical and experimental pumping performance without diffuser are presented. (Author)

Electrical and Electronic Engineering

PB 160 931 $8.10

Armour Research Foundation, Chicago, Ill.
A STUDY OF CRYSTAL OSCILLATOR CIRCUITS, by H. E. Gruen and A. O. Plait. Quarterly progress rept. no. 4, 15 Feb-15 May 56, on Contract DA 36-039-sc-64609. [1956] 89p. AD-103 164.

DESCRIPTORS: *Crystal oscillators, *Oscillator circuits, Circuits, Design, Radiofrequency oscillators.

Design data for the Grounded Grid and Cathode Coupled oscillators, operating in the frequency range of 75 to 150 mc, is presented in the form of graphs and tables. This circuit performance data was obtained by varying specific circuit parameters and measuring the resulting change in circuit operation. This information is presented in a series of graphs for each circuit at four frequencies throughout the range of interest. These frequencies are 75, 105, 135 and 150 mc. Frequency effects of these circuits as a function of operating voltage are included in a comparative table. Explanation and discussion of the resulting design information is included for each figure. Comparison of performance with the use of a variety of miniature and subminiature tube types is made on the basis of power output, crystal drive level, operating frequency and frequency stability. The advantages of certain tube types is discussed. The effects of temperature on frequency of VHF crystals and oscillators have been determined for typical units. Characteristics of the crystals alone, as well as complete circuit effects, were measured over the -55° to +90°C temperature range. Difficulties associated with certain component temperature characteristics are discussed and circuit designs resulting in stabilities well within 0.01% for both the effect of temperature and supply voltage variations are shown.

PB 160 954 $1.60

Chrysler Corp., Detroit, Mich.
RESEARCH PROGRAM ON SEMICONDUCTING COMPOUNDS FOR THERMOELECTRIC POWER GENERATION AT HIGH TEMPERATURES, by C. R. Lewis. Bimonthly progress rept. no. 2, 15 July-14 Sep 60, on Contract NObs-78664. [1960] 11p.

DESCRIPTORS: *Thermoelectricity, Electric power production, *Thermoelectric generators, *Semiconductors, Refractory materials, Metals, Intermetallic compounds, Tungsten compounds, Tantalum compounds, Selenides, Tellurides, Germanium, Bismuth, Antimonides, Rhenium compounds, Nickel alloys, Aluminum alloys, Molybdenum compounds, Aluminum, High temperature research, Preparation.

Eleven of the twenty-four possible binary compounds of the heavy refractory metals to be included in the first survey have been studied: Tungsten Selenide; Tungsten Telluride; Tungsten Germanium; Tungsten Bismuth; Tungsten Antimony; Tantalum Selenium; Tantalum Tellurium; Tantalum Germanium; Tantalum Bismuth; Tantalum Antimony; Rhenium Antimony; Nickel Aluminide; and Molybdenum Aluminum.

PB 162 034 $14.00

Clevite Corp., Cleveland, Ohio.
DESIGN, DEVELOPMENT, AND LIMITED PRODUCTION OF FIXED TUNED 455 KC TRANSISTOR I-F AMPLIFIERS WITH CERAMIC FILTER ELEMENTS, by Jerome H. Silverman. Final rept. 16 Sep 58-1 July 60, on Contract DA 36-039-sc-78182. 16 Feb 61, 204p. 4 refs. AD-252 166.

DESCRIPTORS: *Intermediate frequency amplifiers, Medium frequency, Amplifiers, *Band-pass filters, *Band-pass amplifiers, *Radiofrequency amplifiers, *Radiofrequency filters, Ceramic materials, Transistors, *Transistor amplifiers, Piezoelectric materials, Design.

The development is presented of engineering techniques for utilizing ceramic bandpass filters in transistorized IF strip circuitry. An IF frequency of 455 kc was used. IF strips were constructed with gains up to 80 db, and 6 db bandwidths ranging from 4 to 32 kc. Shape factor for the 32 kc bandwidth units is approximately 1.3 (60/6 db). A minimum component philosophy was used in the design of the transistor amplifiers, and a nonlinear bias stabilization technique was developed. The complete stabilized stage consists of a transistor, 2 resistors, and a diode. A graphical technique is used to predict the bias stability. The nonlinear technique was not necessary in the units utilizing silicon transistors. The major consideration in the application of the ceramic filters is impedance matching. The most difficulty was experienced due to the bilateral nature of transistors, which is enhanced at high frequencies. The difficulty was overcome by isolating the filter from the circuitry with resistive attenuators. The attenuators also provide the correct filter termination. (Author)

PB 162 041 $10.50

Collins Radio Co., Cedar Rapids, Iowa.
MUTUAL ENVIRONMENTAL TESTS OF UHF EQUIPMENT EMPLOYING SELECTIVE FILTERS, PHASE I, ITEM 6, by Robert E. Canfield. Final development rept. on Contract AF 30(602)1402. 16 Apr 56, 140p. 13 refs. Rept. no. CER-472; RADC-TR-56-66; AD-96 525.

DESCRIPTORS: *Radio communication systems, *Ultrahigh frequency, Interference, Radio interference, Measurement, Tests, Electronic equipment, *Radiofrequency filters, Selection.

An investigation was conducted to determine the effectiveness of tandem cavities in reducing mutual interference effects occurring when combinations of single channel uhf transmitters and receivers are used in close frequency and physical association. Utilizing various combinations of radiating channel frequencies, interference data were acquired for system operation with and without six-inch tandem cavities installed between transmitter output terminals and antenna. Representative data were obtained on spectrum interference between 100 and 1000 megacycles, cross modulation of receiving channels, on-channel mutual interference, and receiver desensitization. Test results obtained without cavities showed that levels of cross modulation, on-channel interference due to intermodulation and receiver images, and resulting receiver desensitization seriously reduced the number of usable receiving channels when more than a few transmitters were employed. Installation of tandem cavities between the antenna terminals of each transmitter-receiver and its associated antenna removed all traces of mutual radiated interference. The results of these tests stringently point out the need for selective filtering such as that supplied by tandem cavities for the successful operation of an M-site configuration of uhf equipments. (Author)

PB 160 911 $1.60

Cornell Aeronautical Lab., Buffalo, N. Y.
EVALUATION OF HEAT TRANSFER TECHNIQUES FOR MINIATURIZED ELECTRONIC EQUIPMENT, by James P. Welsh. Interim rept. no. 21, July-Sep 56, on Contract NObsr-63043. [1956] 18p. 42 refs. Rept. no. HF-845-D-21; RADC-TN-57-28; AD-114 247.

DESCRIPTORS: *Miniature electronic equipment, Electronic equipment, *Heat transfer, Cooling

PB 160 988 $1.60

General Ceramics Div., Indiana General Corp., Keasbey, N. J.
OXIDE THERMOELECTRIC MATERIALS. Bimonthly progress rept. no. 5, 1 Oct-2 Dec 60, on Contract NObs-78414. [1960] 13p.

DESCRIPTORS: *Thermoelectricity, *Materials, Zinc compounds, Aluminum compounds, Titanium compounds, Iron compounds, Vanadium compounds, Cerium compounds, Lanthanum compounds, *Oxides, Electrical properties, Direct current, Resistance, Temperature, Thermoelectric generators.

DESCRIPTORS: *Thermoelectricity, Electric power production, *Thermoelectric generators, Materials, Aluminum compounds, Arsenides, Alloys, Preparation, Electrical properties, Physical properties, Thermal conductivity, Semiconductors, Transport properties.

Experimental work on AlAs is under way and a variety of techniques have been considered in selecting the best method for determining thermal conductivity in the materials and at the temperatures of interest on this project. Progress is reported in the investigation of the influence of thermomagnetic effects in the determination of transport coefficients in semiconductors having thermoelectric figures of merit of reasonable magnitude. (Author) (See also PB 160 956)

PB 160 960 $1.60

Battelle Memorial Inst., Columbus, Ohio.
THERMOELECTRIC POWER GENERATION AND RELATED PHENOMENA, by T. S. Shilliday. Bimonthly rept. no. 7, 7 Nov 59-7 Jan 60, on Contract NObs-77034. 26 Feb 60, 16p. 2 refs. AD-240 525.

DESCRIPTORS: *Thermoelectricity, Power, Materials, Electrical properties, Metallurgical analysis, Metallic compounds, Alloys, Aluminum compounds, Gallium compounds, Arsenides, Heat transfer, Transport properties.

Effort was directed toward (1) the preparation of alloy ingots of GaAs-AlAs of low Al content ($\leq$ 10 mol-% AlAs) by the zone-leveling technique with induction heating and by the normal freeze technique with resistance heating, (2) the determination of a suitable container for the preparation of AlAs, and (3) testing of the high-temperature measurement apparatus. The thermal-gradient crystal-growth technique was applied to the preparation of the alloy from a GaAl solution. Selected specimens were studied by X-ray diffraction, metallographic examination, hardness determinations, and chemical analysis to determine composition and the degree of homogeneity. Problems of thermal diffusivity measurements considered were: (1) the construction of the apparatus, (2) the forming of electrical contacts to the alloy samples, and (3) an analysis of the time dependence of the intensity of radiation impinging on the sample. Further consideration was given to the differences between the adiabatic and isothermal values of transport coefficients, and the calculations were generalized to account for arbitrary single scattering mechanisms and arbitrary degrees of carrier degeneracy. The experimental arrangement necessary to measure the pertinent quantities was assembled, and preliminary measurements are being made. (See also PB 160 959)

PB 160 961 $5.60

Battelle Memorial Inst., Columbus, Ohio.
THERMOELECTRIC POWER GENERATION AND RELATED PHENOMENA, by T. S. Shilliday. Summary rept. 7 Nov 58-7 Mar 60, on Contract NObs-77034. 21 Apr 60, 51p. 11 refs. AD-245 027.

DESCRIPTORS: *Thermoelectricity, *Electric power production, Semiconductors, Tellurides, Arsenides, Electrical conductance, Resistance, Gallium compounds, Aluminum compounds, Selenides, Bismuth compounds, Antimony compounds.

Specimens of the alloys of Bi_2Te_3 with Sb_2Te_3 and with Bi_2Se_3 were prepared by the Bridgman technique. Approximate values of various physical properties of AlAs were: lattice constant, 5.6585 A; melting point, 1700°C; and dissociation pressure, 2.0 atmospheres at the melting point; Knoop hardness, 614 kg/mm^2. GaAs-AlAs alloy specimens exhibited, at room temperature, resistivities ranging from 10^{-2} to 10^{-3} ohm-cm, mobilities of 10^{-1} to 10^2 cm^2/volt-sec, thermoelectric powers of 186 to 1100 microvolt/°C, and carrier concentrations of 3.6×10^{16} to 6.2×10^{18}/cm^3. A new high-temperature measurement apparatus was developed which makes possible measurements of resistivity, Hall coefficient, and thermoelectric power as functions of temperatures up to approximately 700°C while the specimen is under a controlled pressure of its volatile constituent, e. g., arsenic. (Author) (See also PB 160 960)

PB 162 031-1 $13.50

Bomac Labs., Inc., Beverly, Mass.
IMPROVED 4 MM MAGNETRON. VOLUME I, by Thomas Diggins, Robert W. Wolfe, and Frederick B. Parks. Final engineering rept. for 24 Oct 57-15 Sep 59, on Contract DA 36-039-sc-73285 [1959] declassified 16 June 60. 192p. 2 refs. Rept. no. BL-221; AD-239 411.

DESCRIPTORS: *Magnetrons, Design, Resonance, Tables, Tests, Specifications, Modulators, Test equipment, Anodes.

Work was directed toward the development of a 4.3 magnetron with improved electrical characteristics and more rugged construction, such that in excess of 10 kw of pulsed power could be produced at duty cycles of the order of .0005. This involved a redesign of the prototype wherein the anode design was changed from 22 to 38 cavities in order, primarily, to permit a significant increase in cathode diameter. This report discusses the new design in detail, the fabrication of sample magnetrons and their evaluation. Much data is also given on indivicual tube performance and on test methods and equipment. (Author)

PB 162 031-2 $11.00

Bomac Labs., Inc., Beverly, Mass.
IMPROVED 4 MM MAGNETRON. VOLUME II, by Thomas Diggins, Robert W. Wolfe, and Frederick B. Parks. Final engineering rept. 24 Oct 57-15 Sep 59, on Contract DA 36-039-sc-73285. [1959] declassified 16 June 60. 148p. Rept. no. BL-221; AD-239 412.

DESCRIPTORS: *Magnetrons, Design, Materials.

Material list, parts and assembly drawings are presented for the 22-cavity design magnetron. (Author) (See also PB 162 031-1)

PB 162 030

Kidde, Walter, and Co., Belleville, N. J.
STATIC SWITCHING DEVICES, by Robert Langfelder. Final rept. 1 June 58-30 June 59, on Contract DA 36-039-sc-78170. [1959] 40p. AD-228 217.

DESCRIPTORS: *Electronic relays, Design, Semiconductors, Transistors, Tests, Teletype equipment, *Switching circuits, Circuits.

The engineering foundation is created for the design of static relays based on the use of semiconductor elements. This foundation is established by a consideration of the design approaches to the component parts of a static relay:—the activation circuit, "contact" circuit, and d-c to d-c converter section (where required). This analysis is extended to include the detail design and fabrication of the SPST, polar, latching, and teletype relays. (Author) (See also PB 156 769)

PB 162 086 $8.10

Kidde, Walter, and Co., Inc., Belleville, N. J.
STATIC SWITCHING DEVICES, by Richard Gilbert. Final rept. 1 Nov 59-31 Oct 61, on Contract DA 36-039-sc-85240, continuation of Contract DA 36-039-sc-78170. [1961] 83p.

DESCRIPTORS: *Switching circuits, *Electronic switches, *Electronic relays, Photoconductivity, Semiconductors, Transistors, Diodes, Waveform generators, Teletype systems.

This report describes the development of static relays which extend the state of the art to include low level signal switching relays, high current relays, minimum cost general utility relays, and relays for special applications. (Author) (See also PB 160 042)

PB 159 643 $1.60

Lockheed [Aircraft Corp.] Sunnyvale, Calif.
DESIGN PROCEDURES FOR FILM TYPE DISTRIBUTED PARAMETER CIRCUITS, by W. W. Happ and W. D. Fuller. [1961] 14p. 9 refs. LMSC-6-90-61-60.

DESCRIPTORS: *Electronic circuits, Circuits, Design, Thin films, Synthesis, Distributed amplifiers, Parametric amplifiers, Band-pass amplifiers, Electrical networks.

Design procedures for thin film circuits using distributed parameter networks are more complex than those of lumped parameter circuits. The designer synthesizes network functions rather than component assemblies in a continuous pattern that tends to minimize junctions between dissimilar materials and the volume of the subsystem. The required design tools are techniques for subnetwork generation, asymptotic techniques for the construction of Bode and Nyquist graphs of d-p functions, catalogues of thin film network morphologies, basic component relationships, a knowledge of materials and processes, and an intuitive understanding of descriptive geometry. The design procedures for the translation of a lumped component circuit into a thin film circuit include function analysis, component to network translation, network specifications, selection of materials and processes for fabrication of the circuit pattern, and the specification of test procedures. These techniques, tools and procedures are illustrated in the design of a band-pass amplifier. (Author)

PB 159 642 $2.60

Lockheed [Aircraft Corp., Sunnyvale] Calif.
DISTRIBUTED PARAMETER CIRCUIT DESIGN TECHNIQUES, by W. W. Happ and P. S. Castro. [1961] 26p. 40 refs. LMSC-6-59-61-1.

DESCRIPTORS: *Electronic circuits, Circuits, Design, Thin films, Electrical networks, Synthesis, Distributed amplifiers, Parametric amplifiers, Oscillators.

A systematic account of design techniques for distributed parameter networks resulting from circuit of film-type construction includes: Bode and Nyquist plots, interfilm capacity effects, filter and notch network design, as well as synthesis procedures for Microsystem Electronics. (Author)

PB 159 647 $5.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
EFFECTS OF GAMMA RADIATION ON A TRANSISTOR RC PHASE-SHIFT OSCILLATOR, by Virgil W. Moore, Jr. Walter M. Locke, and William W. Happ. May 60, 56p. 10 refs. LMSD-288123; AD-251 109.

DESCRIPTORS: *Oscillators, Phase shifters, Semiconductors, *Transistors, Circuits, Electronic equipment, Resistors, Capacitors, Cobalt, Frequency, Stability, *Gamma rays, *Neutrons, Tests, *Radiation damage, *Radioactivity, *Oscillator circuits, Radiation effects.

An investigation was conducted of a transistor RC phase-shift oscillator in operation in a 1000 curie cobalt-60 gamma-ray environment. A total of seven identical oscillator circuits were irradiated producing changes in the transistor hybrid parameters, in circuit output voltage, and in frequency as a function of dosage. Failure analysis graphs show the probability of derated frequency and derated output voltage for the circuit, and derated current gain for the transistor. (Author)

PB 159 648 $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
THE FUNCTION OF THE TRANSISTOR IN A PHASE-SHIFT OSCILLATOR, by Walter M. Locke, Virgil W. Moore, Jr. and William W. Happ. May 60, 50p. 22 refs. LMSD-288124; AD-251 108.

In the $(Al_2O_3)_x(ZnO)_{100-x}$ series, "x" was varied from 0.5 to 3.0 in steps of 0.5. The resistivity results are in reasonably good agreement with those reported previously. None of the $(TiO_2)_x(Fe_2O_3)_{100-x}$ compositions ("x" ranging from 1.5 to 6.0) that were investigated appeared to be particularly promising as power generators. These compositions were N-type. (Author)

NASA N62-14934 $4.60

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
FACILITY DESCRIPTION: ANTENNA PERFORMANCE MEASURING RANGE. BEAVERDAM ROAD, PRINCE GEORGES COUNTY, GREENBELT, MARYLAND, by Paul A. Lantz. 1st rev. May 62. 48p. I-525-62-58.

PB 162 036 $2.60

International Resistance Co., Philadelphia, Pa.
RESISTORS, FIXED FILM TYPE GENERAL PURPOSE, by William F. Ebling and Jerome G. Burns. Quarterly progress rept. no. 4, 1 Apr-30 June 60, on Contract DA 36-039-sc-81283. [1960] 28p. AD-240 703.

DESCRIPTORS: *Fixed resistors, *Resistors, Manufacturing methods, Production, Films, Carbon, Deposits.

Work was performed on the deposition of low range carbon films with satisfactory initial results. A comparison between CP40B and CP40D (a modified version of CP40B), was made, which showed CP40D to be the better contact paint. A comparison was also made between CP40B and CP507; this evaluation showed that CP40B is superior to CP507, particularly on cure time and subassembly strength. Development work on a contact paint with a cure time of less than 1 hour continued; initial results indicate that this approach is feasible and may produce a CP with better characteristics than CP40D. Work on molding compounds consisted of investigation of "plastic flow", types of compounds, concentricity of subassemblies in the mold jacket, and moisture cycle tests. Work on the filament machine has progressed to the point where only a few stations have yet to be completed. The prototype overcoating machine has been completed, and the cure ovens and filament cutting machine have been designed. The diamond saw filament cutting technique was tested with resulting low defects and close control of cut length. (Author) (See also PB 158 818-3)

PB 162 052-2 $13.00

[ITT] Kellogg, Chicago, Ill.
DEVELOPMENT OF A TRANSPORTABLE LIGHTWEIGHT ELECTRONIC LOWER ECHELON AUTOMATIC SWITCHBOARD AN/TTC-14, by T. A. Pickering, E. S. Bieszczad, and others. Quarterly progress rept. no. 2, 1 Jan-31 Mar 59, on Contract DA 36-039-sc-77988. [1959] 181p. AD-217 727.

DESCRIPTORS: *Multichannel telephone systems, Panel boards (Electricity). *Switching circuits, Electronic equipment, Automatic

The system and circuit considerations are presented for the development of an Electronic Automatic Switchboard to be used with a four-wire telephone system. Modifications to the equipment and circuits described previously (AD-214 030) on the subject switchboard are presented. The results of acceptance testing performed by the Signal Corps on the Engineering Test Model of the switchboard are presented. A summation of development work done in the field of magnetic logic circuits for application in the switchboard is presented. Further investigations into the mechanical design of the subject switchboard are discussed. (Author)

PB 162 052-3 $10.50

[ITT Kellogg] Chicago, Ill.
DEVELOPMENT OF TRANSPORTABLE LIGHTWEIGHT ELECTRONIC LOWER ECHELON AUTOMATIC SWITCHBOARD AN/TTC-14, by E. S. Bieszczad, A. E. Feder, and others. Quarterly progress rept. no. 3, 1 Apr-30 June 59, on Contract DA 36-039-sc-77988. [1959] 132p. AD-225 926.

DESCRIPTORS: *Multichannel telephone systems, *Switching circuits, *Panel boards (Electricity), Corrections, Electronic equipment, Automatic.

Further design modifications to the lower echelon automatic switchboard are presented. The results of efforts toward weight reduction are outlined, with further steps toward this end indicated. The design of special inoperation fault-location circuitry is described. Photographs of the unit Illustrative Models are shown. Further refinement of the Operator's Position required for the switchboard is detailed, with the majority of the work completed. The design of the printed-circuit cards to be used in the Service Test Models is discussed, as is the design of the actual package and access features. A summary of the results of the compatibility test with other switchboards for use in the same system is shown, indicating a fully satisfactory functioning of the unit with other electronic switchboards. Further cyclical testing of the unit has been carried out; the circuits for performing this are shown, and a summary of results given. (Author) (See also PB 162 052-2)

PB 160 919-2 $8.60

Monsanto [Research Corp.] Everett, Mass.
FUEL CELLS, by F. B. Leitz, Jr. and D. A. Sama. Quarterly progress rept. no. 2, 1 Jan-31 Mar 60, on Contract DA 44-009-eng-4154. 27 Apr 60, 93p. 2 refs. AD-244 775.

DESCRIPTORS: *Fuel cells, *Hydrazines, *Ammonia, *Wet cells, Platinum, Electrodes, Oxidation, Electrolytes, Power supplies, Fuels, Catalysts, Electric potential, Methanols, Alcohols.

The objective of this investigation is to study the feasibility of using liquid fuels including hydrocarbons, partially oxidized hydrocarbons, and nitrogen-containing compounds in fuel cells. Using low molecular weight fuels soluble in the electrolyte it appears that concentration polarization will be minor at a current density of 100 ma/cm^2 and fuel concentrations greater than one molar. This conclusion has been confirmed experimentally and theoretically. It is understood that a cell operating efficiently at 100 ma/cm^2 would be useful and practical. If further investigation confirms the present preliminary results, it would appear that hydrazine and ammonia could operate in basic solution at platinum electrodes at 100 ma/cm^2 with a drop in potential of 0.1 volt or less. This indicates a real commercial possibility for these fuels.

PB 160 919-3 $5.60

Monsanto [Research Corp.] Everett, Mass.
FUEL CELLS, by F. B. Leitz, Jr., D. A. Sama, and J. H. Porter. Quarterly progress rept. no. 3, 1 Apr-30 June 60, on Contract DA 44-009-eng-4154. 15 July 60, 55p. 3 refs. AD-244 776.

DESCRIPTORS: *Fuel cells, *Wet cells, *Fuels, *Catalysts, Power supplies, Electrolytes, Electrodes, Polarization, Oxygen, Electric potential, Methanols, Hydrazines, Oxidation.

The first data have been obtained from the catalyst evaluation program, and considerable differences in catalyst activities were found. The catalyst used were smooth strips of rhodium, iridium, platinum, palladium, silver, and gold. For each catalyst, thirteen runs were performed using hydrazine, ammonia, methanol, and diisobutylene as fuels in acidic, basic, and neutral electrolytes. The order of effectiveness of the metal catalysts was found to differ for the different fuel-electrolyte combinations. This indicates a degree of catalytic specificity. In many cases it was found that other metals were more effective catalysts than platinum. Polarization curves have been obtained for oxygen electrodes using platinum and silver catalysts in electrolytes ranging from 10 molar potassium hydroxide to 17 molar sulfuric acid. The open-circuit potentials obtained with the platinum electrode were found to be consistently about 0.20 volt less positive than the reversible potentials predicted from the Nernst equation. Experiments using a boric acid-glycol electrolyte with methanol and hydrazine indicated that the electrolyte did not show any potential usefulness. (Author) (See also PB 160 919-2)

PB 162 060 $7.60

Mound Lab., Miamisburg, Ohio.
NUCLEAR BATTERY-THERMOCOUPLE TYPE, by B. C. Blanke and J. H. Birden. Final rept. on Contract R-50-799965-sc-01-91. 1 Oct 60, 74p. 31 refs. Rept. no. MLM-1106; AD-251 119.

DESCRIPTORS: *Radioactive isotopes, Tests, *Thermoelectricity, *Radioactive batteries, Polonium, Heat production, Thermocouples.

The potential usefulness of approximately 1300 radioactive isotopes as a heat source for the thermoelectric generator was investigated. Only 47 are found to have the proper characteristics of high specific activity and usable half-life combined with an easily absorbable radiation. These isotopes are discussed showing possible sources of supply, the hazards involved and the expected performance. Three large polonium-210 heat sources were designed and constructed (for battery use), including one for the SNAP III generator. One small thallium-204 test heat source was made by irradiation. Eight thermoelectric generators were developed and two of these were used as thermoelectric batteries. Theoretical equations for non-semiconductor thermoelectric materials and experimental measurements to verify the Thompson and Peltier effects are given. (Author) (See also PB 154 963)

PB 160 933 $2.60

Nickel Cadmium Battery Corp., Easthampton, Mass.
PRELIMINARY STUDY OF SINTERED PLATE NICKEL CADMIUM CELLS, by Arthur Fleischer. Quarterly progress rept. no. 1 on Contract DA 20-089-ORD-37131. 3 Jan 55, 30p. 26 refs. AD-52 226.

DESCRIPTORS: *Storage batteries, *Low temperature batteries, Sintered alloys, Cadmium, Nickel, Batteries and components.

Research is being conducted to develop a sintered-plate Ni-Cd storage battery which will perform at -65°F. A literature survey is presented on sintered-plate batteries. Various cell combinations were evaluated. Data are presented on plate thickness for positive and negative plates. The effect of plate separation is being studied. The use of the Kralastic Pb-acid battery case is discussed.

PB 160 932 $9.10

[Office of Research Administration] U. of Michigan, Ann Arbor.
FERROELECTRIC MATERIALS AND THEIR APPLICATION, by Howard Diamond. Technical rept. no. 31 (Interim rept.) on Contract DA 36-039-sc-63203. July 54, 101p. Rept. no. 2262-37-T; AD-41 885.

DESCRIPTORS: *Ferroelectric materials, Tuning devices, Radar equipment, Materials.

DESCRIPTORS: *Transistors, *Phase shifters, *Oscillators, *Oscillator circuits, Mathematical analysis

The relationship between transistor parameters and circuit characteristics of an RC phase-shift oscillator is analyzed by flow-graph and root-locus techniques. Exact formulae and approximations for the starting frequencies of three- and four-section RC phase-shift oscillators are derived. Prediction of the operating frequency for a given current gain is presented graphically and compared with experimental results. (Author)

PB 162 054 $2.60

Maintenance Lab., Lowry AFB, Colo.
A PART-TASK TRAINER TROUBLESHOOTING, by Norman A. Crowder. June 57, 26p. Rept. no. AFPTRC TN-57-71; AD-131 423.

DESCRIPTORS: *Training devices, *Maintenance personnel, *Electronic equipment, Aviation personnel, *Display systems, Corrections.

The development of a simple, inexpensive part-task trainer for training in troubleshooting complex equipment is described. This device is called the MIT (malfunction information trainer). Its characteristic feature is that it permits the trainee a wide but not unlimited choice of conditions under which he may check the behavior of the equipment system, and furnishes the check results in a coded symbolic form, at any of 478 test points in the system under any of 28 different combinations of control settings and signal injection procedures. Means to minimize the dependence of a trainee on an instructor in learning from the use of the device are described. These methods have not been experimentally evaluated because it would be sounder and more economical to do so in an experiment in an actual operational organization. Results from experimentation with the MIT indicate that (1) it is feasible to represent a useful part of the operation of the system in symbolic form; (2) after the description of a normal system was written, the description of a specific malfunction could be written by a skilled operator in a few minutes to a few hours; (3) practical reproduction methods for the coded materials were worked out and an inexpensive display device designed and constructed; (4) students understand the symbolic code after a short instruction period and can troubleshoot problems in the device; and (5) certain supporting materials in a self-instructional program are feasible.

PB 160 991 $1.60

Materials Research Corp., Orangeburg, N. Y.
THIN FILM TECHNIQUES IN THERMOELECTRICITY, by M. Levy, H. Gurev and others. Quarterly rept. no. 1, 20 Oct 61-20 Jan 62, on Contract NObs-86216. 31 Jan 62, 11p. 1 ref. MRC no. 281.

DESCRIPTORS: *Thermoelectricity, *Thin films, *Alloys, Vapor plating, Bismuth alloys, Tellurium alloys, Selenium alloys.

Exploratory studies were begun to determine the effects of vapor source temperature (deposition time), substrate material, temperature, and system vacuum on the thermoelectric behavior of thin films relative to initial bulk material. A series of alloys which have been reported to exhibit the most promising thermoelectric properties was prepared by melting together the elemental components of 99.999% purity in evacuated quartz capsules. Alloys prepared in this manner included stoichiometric compounds of Bi_2Te_3, PbTe, PbSe, Bi_2Se_3, as well as ternary alloys of the Bi-Te-Se and Bi-Sb-Te systems. The present report covers principally thin film deposition of n and p-type complex alloys of optimum thermoelectric compositions. (Author)

PB 160 992 $1.60

Materials Research Corp., Orangeburg, N.Y.
THIN FILM TECHNIQUES IN THERMOELECTRICITY, by M. Levy, H. Gurev and others. Quarterly rept. no. 2 on Contract NObs-86216. 9 Apr 62, 12p. MRC no. 291; ARPA Order 219/61.

DESCRIPTORS: *Thermoelectricity, *Thin films, *Alloys, Vapor plating, Evaporation, X-ray diffraction analysis, Impurities, Copper compounds, Bromides, Bismuth alloys, Tellurium alloys, Selenium alloys.

Process parameters for production of thin film thermoelectric elements have been optimized and a partial understanding has been obtained of the basic properties of thin film thermoelectric alloys formed by vapor deposition. P-type films have been produced which exhibited the Same Seebeck voltages as bulk starting material, 210 $\mu V/^oC$ and n-type films were deposited of higher Seebeck values than their starting alloy bulk value, 167 $\mu V/^oC$ vs. 35 $\mu V/^oC$. (Author)

PB 162 025 $1.60

Merck and Co., Inc., Rahway, N. J.
STRUCTURAL INVESTIGATIONS IN THERMOELECTRIC MATERIALS, by P. I. Pollak, J. B. Conn, and others. Progress rept. no. 1, 1 June-31 July 60, on Contract NObs-78503. [1960] 12p. 2 refs. AD-245 073.

DESCRIPTORS: *Thermoelectricity, Tellurides, Selenides, Bismuth alloys, Antimony alloys, Resistance, Selenium alloys, Tellurium alloys, Crystal structure, Electrical conductance, Lattices, X-ray diffraction analysis, *Semiconductors, *Electric power production.

An investigation was made of the thermoelectric alloy $Bi_{24}Sb_{60} + xSe_6Te_{150-x}$. Stoichiometric analysis of the superstructure unit cell suggests the existence of antimony in both the 3+ and 5+ oxidation states. This variable makes the alloy a poised system and permits in principle the investigation of twenty integral alloys ($-8 < x < 12$). The most interesting compositions with figures of merit in excess of $3 \times 10^{-3} oK^{-1}$ were found in the range $6 < x < 8$. (Author)

PB 160 923 $12.00

Pickard and Burns, Inc., Needham, Mass.
THE ENGINEERING STUDY AND INVESTIGATION LEADING TO THE DESIGN AND CONSTRUCTION OF A VHF-UHF DIRECTIONAL ANTENNA. Quarterly rept. no. 2, 1 Oct 54-21 Jan 55, on Contract AF 30(602)1242. 27 Jan 55, 162p. P&B Pub. no. 279; [RADC-TN-55-154]; AD-65 027.

DESCRIPTORS: *Balloons, *Antennas, Ultrahigh frequency, Very high frequency, Design, Construction, Antenna masts.

To make the antenna system mechanically feasible, it seems advisable to compromise the height of the low frequency array from 33 ft. as required by the electrical specifications to 15 ft. It is also suggested, especially if the side and back lobes can be reduced, that thought be given to another modification that would simplify the mechanical problem. This change would involve a reduction of the diameter of the lowest frequency band array by 25%. The inflatable torid scheme number 16 has been examined and found practical. Work on the flexible antenna elements has indicated good results as to their utility with any type mechanical scheme that might be chosen. Circuit designs and component selections are being made which indicate that the electrical performance requirements of the specification can be met. Calculations are establishing predicted characteristics of the various component parts of the system. At the present time it appears that the bearing accuracy may be of the order of $\pm 1^{o}$ using suitable bearing correction data. (See also PB 160 922)

PB 160 989 $1.10

RCA Labs. [Div., Radio Corp. of America] Princeton.
THERMOELECTRIC MATERIALS AND POWER CONVERSION. Quarterly status rept. no. 1, 1 Feb-30 Apr 61, on Contract NObs-84660. [1961] 3p.

DESCRIPTORS: *Thermoelectricity, *Materials, Silver compounds, Antimony compounds, Lead compounds, Tin compounds, Tellurides, Metallic compounds, Silicides, Rare earths, Sulfides, Thermal conductivity, Temperature, Electric power production, Thermoelectric generators.

Contents:
Materials:
Ternary compounds and alloys
Metal silicides
Rare earth sulfides
Thermal conductivity at high temperatures
Thermoelectric power generation
Future work

PB 160 990 $1.60

RCA Labs. [Div., Radio Corp. of America] Princeton.
THERMOELECTRIC MATERIALS FOR POWER CONVERSION. Quarterly status rept. no. 3, 1 Aug-31 Oct 61, on Contract NObs-84660. [1961] 14p. 5 refs.

DESCRIPTORS: *Thermoelectricity, *Materials, Tin compounds, Lead compounds, Tellurides, Alloys, Rare earths, Sulfides, Silicon alloys, Germanium alloys, Thermal conductivity, Resistance, Temperature, Calorimetry, Electric power production, Thermoelectric generators.

A differential thermal analysis investigation of SnTe and the SnTe-SnSe system showed that SnTe is non-stoichiometric with the congruent melting point near the composition $SnTe_{1.03}$, and that this anion excess exists throughout the SnTe-rich side of the SnTe-SnSe pseudobinary system. The alloy system PbTe-SnTe has been examined with a view to obtaining p-type material to operate in the temperature range 200-550°C. Measurements of thermoelectric power, Q, and resistivity, ρ, as a function of temperature were carried out. The discovery that Si-Ge alloys possess properties for thermoelectric power generation superior in several ways to previous materials has led to an investigation of some possible methods for their preparation. The thermal conductivity, κ, electrical resistivity, ρ, and thermoelectric power, Q, were determined in the temperature range, 300 - 1200°K, on p- and n-type Si - Ge alloys. (See also PB 160 989)

NASA N62-14845 $15.50

RIAS, Inc., Baltimore, Md.
AN AUTOMATIC SYNTHESIS PROGRAM FOR OPTIMAL FILTERS AND CONTROL SYSTEMS, by R. E. Kalman and T. S. Englar. Final rept. on Contract NASr-57. July 62, 236p. 19 refs.

SCTM-345-60(72) $2.60

Sandia Corp., Albuquerque, N. Mex.
TELEMETRY BAND DISTANCE MEASURING EQUIPMENT, by T. A. Sellers and J. T. Lannon. Nov 60, 25p.

PB 160 920-1 $4.60

Stanford Research Inst. [Menlo Park] Calif.
STRIP TRANSMISSION LINES AND COMPONENTS, by S. B. Cohn, L. A. Robinson, and J. Shimizu. Quarterly progress rept. no. 1, 1 July-30 Sep 54, on Contract DA 36-039-sc-63232. Nov 54, 46p. AD-51 736.

DESCRIPTORS: *Transmission lines, Electrical properties, *Microwave equipment, *Printed circuits, Circuits, Impedance, Attenuation.

The subject of strip transmission lines is briefly discussed and a review is given of characteristic-impedance formulas for the shielded-strip cross section. These formulas are then used in the derivation of attenuation and Q formulas. Graphs of characteristic impedance, attenuation, and Q are presented,

A summary is given of the basic properties of ferroelectric materials and their applications to wide-range tuning devices, with emphasis on the electric tuning of RF components. Data are presented on the measured properties of ceramic and single-crystal materials and on other important effects, such as Barkhausen noise, polarization lag, and double hysteresis loops in titanate ceramics. The application of silver electrodes by vacuum evaporation resulted in reduced losses in titanate ceramic specimens and in single crystals. The variations of dielectric constant are shown for representative materials by using epsilon-temperature surfaces, butterfly loops, and tuning curves. Test results in tabular form are given for several local oscillator circuits which employ dielectric tuning.

PB 160 926 $6.60

[Office of Research Administration] U. of Michigan, Ann Arbor.
THEORETICAL AND EXPERIMENTAL INVESTIGATION OF LARGE-SCALE TRAVELING-WAVE TUBES, by J. E. Rowe, H. Sobol, and C. Wen. Quarterly progress rept. no. 1, 1 Aug-1 Nov 56, on Contract AF 30(602)1956. 64p. Rept. no. 2562-1-P; [RADC-TN-57-24]; AD-114 240.

DESCRIPTORS: *Traveling wave tubes, Design, Backward-wave amplifiers, *X-band, Modulation, Amplifiers.

The linear theory developed previously was extended to show that the maximum saturation efficiency is given as a function of the space-charge parameter, QC, and the beam diameter B; the maximum efficiency point occurs around QC ≈ 1 and B= 1.0. Large-signal curves were computed assuming a ratio of helix-to-beam diameter a'/b'= 2. Values of a'/b'=1.4 to 2.0 are typical in experimental tubes depending on the type of focusing and the means for the suppression of backward-wave oscillations. The large-signal curves are relatively independent of a'/b'; the value of a'/b' enters only into the determination of the space-charge field. The sheath-helix impedance is calculated by the Fletcher procedure as explained by J. R. Pierce (Traveling Wave Tubes, 1950). A tube was designed on the basis of the results of the large-signal traveling-wave theory and Pierce's small-signal theory. It will be built with a uniform-helix, RF structure. A spherical-cathode immersed-flow electron gun with an L-cathode will produce the required beam current. The following methods for input and output matchings between helix and waveguides or coaxial cables are considered: (1) helix-to-waveguide, (2) direct connection, (3) coupled helix transducer, and (4) cavity coupler. A general modulation theory is developed.

NASA N62-14131 $1.10

Oklahoma State U. Research Foundation, Stillwater.
DEVELOPMENT OF TRANSISTORIZED MINIATURE FIFTEEN-CHANNEL PULSE-TIME TELEMETER TRANSMITTING SET, by Oscar L. Cooper. Informal progress rept. no. 5, 1 Oct-31 Dec 61, on Contract NASr-4. Jan 62, 6p. 1 ref.

PB 160 924 $1.10

Pickard and Burns, Inc., Needham, Mass.
[BALLOON-SUPPORTED DIPOLE TRIPLE ARRAY (100-225, 225-500, 500-1000 mc)] by Howard J. Rowland. Interim rept. no. 1 on Contract AF 30(602)1242, 9 Aug 54, 8p. AD-49 399.

DESCRIPTORS: *Dipole antennas, *Balloons, Antenna radiation patterns, Polarization, Cable assemblies.

PB 160 925 $1.10

Pickard and Burns, Inc., Needham, Mass.
[BALLOON-SUPPORTED DIPOLE TRIPLE ARRAY (100-225, 225-500, 500-1000 mc)] by Howard J. Rowland. Interim rept. no. 2 on Contract AF 30(602)1242. 15 Sep 54, 3p. AD-49 400.

DESCRIPTORS: *Dipole antennas, *Balloons, Antenna radiation patterns, Polarization.

(See also PB 160 924).

PB 160 922 $12.50

Pickard and Burns, Inc., Needham, Mass.
THE ENGINEERING STUDY AND INVESTIGATION LEADING TO THE DESIGN AND CONSTRUCTION OF A VHF-UHF DIRECTIONAL ANTENNA. Quarterly rept. no. 1, 30 June-30 Sep 54, on Contract AF 30(602)1242. 22 Oct 54, 175p. P&B Pub. no. 260; [RADC-TN-54-423]; AD-51 934.

DESCRIPTORS: *Balloons, *Antennas, Ultrahigh frequency, Very high frequency, Design, Construction, Antenna masts.

An analytical and experimental study leading to the design and construction of a U.H.F. -V.H.F. Directional Antenna has been started. The main emphasis has been placed on determining the parameters that would yield the smallest and simplest configuration for the antenna design. Calculations have been made which indicate that compliance with the specifications would be obtained with a minimum of 48 equally spaced elements around the circumference, with a group of 17 adjacent elements being fed. Experiments were conducted with various radiating elements. The element chosen as having the most suitable properties was a slot antenna cut out of copper screening. A full scale model was constructed for Band III, the experimental patterns of which showed excellent agreement with the calculations. The impedance characteristics were satisfactory over the entire band and no impedance matching elements were required. (Author)

PB 160 964 $1.60

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson.
Bimonthly progress rept. no. 3, 1 Apr-1 June 59, on Contract NObs-77017. 15 July 59, 15p. 2 refs.
SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, Materials, Copper compounds, Sulfides, Thermal conductivity, Resistance.

Attempts to cast cylinders of cuprous sulfide in graphite molds, under a helium atmosphere, were successful and castings free from pits and voids, 1/4 in. in diameter and approximately 3 in. long, were obtained. Evidence of the high thermal stability of nominal cuprous sulfide with respect to thermal emf and resistivity was obtained by heating one sample to 1650°C in an induction furnace and another sample of the same lot to 1200°C during the casting process. Several techniques of thermal conductivity measurement were analyzed to judge their applicability to materials of interest in this study. Particular consideration was given to three methods based on the balance between emission and conduction. The three techniques discussed here are (1) an end heated cylindrical rod, (2) a face heated disc, and (3) an off-axis heated cylindrical rod. (See also PB 160 963).

PB 160 965 $1.60

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson.
Bimonthly progress rept. no. 4, 1 June-1 Aug 59, on Contract NObs-77017. [Aug 59] 9p. 1 ref.
SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Silver compounds, Indium compounds, Tellurides, Electrical conductance, Resistance, Temperature.

Silver indium telluride was prepared by heating equivalent amounts of the elements in an evacuated, sealed quartz tube fitted with a thermocouple well in which a Pt-Pt-10% Rh thermocouple was inserted. Measurements of the Seebeck coefficient, α, and resistivity, ρ, were made on several portions of this preparation in both liquid and solid state. (See also PB 160 964)

PB 160 966 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson.
Bimonthly progress rept. no. 5, 1 Aug-1 Oct 59, on Contract NObs-77017. [Oct 59] 4p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Silver compounds, Indium compounds, Tellurides, Pyrites, Preparation, Copper compounds, Sulfides, Thermal conductance.

Several unsuccessful attempts were made to prepare a stoichiometric sample of $AgInTe_2$. Difficulties encountered in the preparation of synthetic $CuFeS_2$ have not been solved. The method of determining thermal conductivity by use of Peltier heating to establish the temperature gradient in the sample appears to be feasible at high temperatures provided radiation losses can be controlled. (See also PB 160 965)

PB 160 967 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson.
Bimonthly progress rept. no. 6, 1 Oct-1 Dec 59, on Contract NObs-77017. 17 Dec 59, 3p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Pyrites, Preparation, Copper compounds, Sulfides, Electrical conductance.

Efforts to prepare synthetic $CuFeS_2$ of stoichiometric composition were continued. A method utilizing ferrous sulfide and cuprous sulfide heated together in an atmosphere of hydrogen sulfide was employed. A high temperature run on molten cuprous sulfide of the composition $Cu_2S_{1.01_2}$ was completed. Data were obtained up to 1350°C in the high temperature furnace. It appears that the Seebeck coefficient of cuprous sulfide is not lower than +150 μv/°C at 1300°C. (See also PB 160 966)

PB 160 968 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson.
Bimonthly progress rept. no. 7, 1 Dec 59-1 Feb 60, on Contract NObs-77017. 17 Feb 60, 6p. 1 ref.
SRI Proj. no. SU-2681; AD-240 596.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Sulfides, Electrical conductance, Resistance.

The system of baffles, designed to reduce convection currents within the heated zone of the furnace, has permitted measurements of resistivity and Seebeck coefficient to be made on cuprous sulfide up to 1325°C. Tables present the Seebeck coefficient, referred to pure platinum, and the resistivity as a function of the centigrade temperature. For comparison purposes the data obtained on a previous run are also included. The peak in the Seebeck coefficient that occurs just below the melting point of cuprous sulfide is present in both samples. (See also PB 160 967)

relating these quantities to the cross-section dimensions in a particularly convenient form. A standing-wave meter for shielded strip line was designed and constructed. The useful frequency range is approximately 1000-5000 Mc, and the probable accuracy of VSWR measurement is about one percent. A theoretical and experimental study of compensated strip-line Tee junctions has been started. This basic element has wide usage in filters, in hybrid junctions, and for interconnecting components. The underlying theoretical properties of a Tee junction are discussed briefly in this report. A study is in progress that will lead to a strip-line band-separation filter for the 60-275 Mc range.

PB 160 920-2 $6.60

Stanford Research Inst. [Menlo Park] Calif.
STRIP TRANSMISSION LINES AND COMPONENTS, by S. B. Cohn and J. Shimizu. Quarterly progress rept. no. 2, 1 Oct 54-30 Apr 55, on Contract DA 36-039-sc-63232. May 55, 58p. 11 refs. AD-68 190.

DESCRIPTORS: *Transmission lines, Electrical properties, *Microwave equipment, *Printed circuits, Circuits.

This report gives the underlying principles of tunable coupled-cavity filters, and presents theoretical formulas and curves of cavity Q and insertion-loss response. The construction and operation of experimental S-band two-and three-cavity models are described. The performance of the models was found to meet the electrical specifications. A final two-cavity model incorporating a ganging mechanism for tuning has been constructed and delivered, and a final three-cavity model is almost completed. Measurements on the low-pass branch of the band-separation filter are described. The voltage standing-wave ratio (VSWR) of the branch does not exceed 1.26 in the pass band when matching half sections are used at each end of the filter. This VSWR is considered to be sufficiently low for the intended application. A successful high-pass branch has been designed and is now being constructed. A theoretical analysis of coupled-strip transmission lines has been completed. Nomogram charts are presented that give the characteristic impedances of the even and odd modes for a pair of thin coupled strips between ground planes. Design formulas are given that allow for strip thickness, and for the presence of a dielectric supporting sheet. Various applications of this theoretical work are mentioned, such as coupled-strip filters and directional couplers. (Author) (See also PB 160 920-1)

PB 160 962 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 1, 19 Oct 58-1 Feb 59, on Contract NObs-77017. 10 Feb 59, 4p. 2 refs. SRI Proj. no. SU-2681; AD-212 673.

DESCRIPTORS: *Thermoelectricity, *Materials, Thermoelectric generators, Phthalocyanines, Crystals, Electrical conductance.

A study and evaluation was made of various materials both as solids and liquids, for possible use as elements for thermoelectric generators. The principal effort has been devoted to the phthalocyanines, A survey of the literature indicated that measurements of some thermoelectric properties of these compounds had been made on films, low compaction powders, and crystals prepared by sublimation. Research quantities of metal-free, lithium, copper, lead, and zinc phthalocyanines were prepared and purified. Selection of these specific compounds for study was based on the following considerations: (1) for metal-free and copper phthalocyanine considerable information is available in the literature to serve as a comparison of methods; (2) the di-lithium salt was chosen as an example of a monovalent metallic derivative; (3) lead was selected because of its low tendency towards nitrogen coordination, and (4) zinc for its high tendency towards nitrogen coordination.

PB 160 963 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 2, 1 Feb-1 Apr 59, on Contract NObs-77017. 20 Apr 59, 6p. 2 refs. SRI Proj. no. SU-2681; AD-225 378.

DESCRIPTORS: *Thermoelectricity, *Materials, Thermoelectric generators, Copper compounds, Sulfides, Phthalocyanines, Electrical conductance, Resistance.

The results indicated that the thermoelectric properties of phthalocyanines did not warrant further investigation in connection with the project and work on these compounds was discontinued. Measurements of the resistance and thermoelectric power of liquid and solid Cu_2S were made in a quartz cell equipped with graphite electrodes. Pt - Pt 10% Rh thermocouples were inserted to within 1/4-in. of the bottom of each of the 2 current electrodes to monitor the temperature of each leg of the cell. The Pt lead from each thermocouple was used to measure the thermal emf when a temperature difference was imposed by an auxiliary heater. Two potential electrodes connected to a potentiometer measured the potential drop when a known current passed through the charge. The resistivities of Cu_2S in ohm per cm were 0.9×10^{-2}, 1.6×10^{-2}, and 1.4×10^{-2} at temperatures of 400°, 1126°, and 1200°C, respectively. The thermal emf was fairly constant at $+300 \pm 50$ μV/°C from 400°C to just below 1126°C where it rose sharply to +450 μV/°C. After melting, the thermal emf remained at +300 μV/°C from 1126° to 1200°C. The high thermal emf indicated that Cu_2S is a potentially useful thermoelectric material. (See also PB 160 962)

PB 160 975 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 17, 1 June-6 Oct 61, on Contract NObs-77017. 27 Oct 61, 8p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Sulfides, Tellurides, Electrical conductance, Resistance.

Measurements of the Seebeck coefficient and resistivity have been completed for the 20 and 30 mol percent cuprous sulfide mixtures with cuprous telluride. A calculation of α^2/ρ for various compositions in the cuprous sulfide-cuprous telluride system furnishes a means of evaluating the relative usefulness of compositional areas for power generation. (See also PB 160 850)

PB 160 976 $1.10

Stanford Research Inst., Menlo Park, Calif.
THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 18, for 1 Jan-1 Mar 62, on Contract NObs-77017. 19 Mar 62, 6p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Bismuth compounds, Sulfides, Tellurides, Thermal conductance.

Data are presented on the liquid thermal conductivity of the composition 25 mol percent cuprous sulfide and 75 mol percent cuprous telluride in the temperature range from 1078 to 1307°C with an average temperature gradient of 240°C across the sample. An attempt was made to determine the Seeback coefficient of Bi_2S_3 in a sealed system. (See also PB 160 975)

PB 160 915 $10.50

Stelma, Inc., Stamford, Conn.
DEVELOPMENT OF TELETYPEWRITER TRANSMISSION SYNCHRONIZING EQUIPMENT, by E. Grimstad and R. Aylor. Final rept. for 13 June 57-31 Dec 58, on Contract DA 36-039-sc-74818. [1959] 139p. AD-218 367.

DESCRIPTORS: *Teletype systems, *Synchronizers, Transmission, Communication systems.

A summary is presented of the development program resulting in the production of 2 engineering models of the teletypewriter transmission synchronizing equipment. The equipment utilizes 5 separate communications channels, each with a transmission capability of 75 baud (nomially 100 wpm start-stop) for the simultaneous transmission of the 5 elements comprising characters of the 32 character alphabet. Transmission rate is 4500 characters per minute. The equipment is compact and will operate with existing communications facilities. The teletypewriter transmission synchronizer equipment is peculiarly adapted to communication over a high frequency radio path. One system of the teletypewriter transmission synchronizer equipment can, with 1 input and 1 output device, handle as much traffic as twelve 60 wpm transmitters and receivers. This represents a considerable saving in terminal equipment. (Author)

PB 162 051 $2.60

Transitron Electronic Corp., Wakefield, Mass.
HIGH EFFICIENCY SILICON SOLAR CELLS, by Pierre Lamond and Alexander J. Oszy. Semiannual summary rept. no. 1, 18 Sep-31 Dec 59, on Contract DA 36-039-sc-85250. [1959] 26p. AD-232 807.

DESCRIPTORS: Solar energy, *Photoelectric cells, *Photoelectric materials, Photons, Photosensitivity, *Silicon, Effectiveness, Reflection, Coatings, *Power supplies, *Solar cells.

The objective of this contract is to conduct research investigations leading to the improvement of the practical efficiency of silicon solar cells to twelve percent or higher. This program also includes studies into methods that will result in high yields and techniques that will permit mass production of these more efficient cells at the lowest possible cost for a 1 x 2 cm cell. An investigation of the factors limiting the efficiency of solar cells has been started. The contact resistance and the reflection losses at the silicon surface were both studied. The contact resistance was found to be less than 0.09 ohm on the P side and even smaller on the N side. In order to reduce reflection losses at the silicon surface antireflection coatings have been developed to apply to the silicon surface. The results obtained with two such coatings, i.e., silicon monoxide and magnesium fluoride are discussed. (Author)

AD-273 657 $6.60

Westinghouse Electric Corp., Pittsburgh, Pa.
MODULE IMPROVEMENT PROGRAM. Progress rept. no. 2 on Contract NObs-84329. 3 Oct 61, 67p.

DESCRIPTORS: *Thermoelectricity, *Generators, *Electric power production, Thermocouples, *Thermal insulation, *Electric insulation, Materials, *Refractory materials, High temperature research, Thermal conductivity, Electrical properties, Manufacturing methods, Flame spraying, *Organic coatings, *Refractory coatings, Sheets, Silicone resins, Resins, Oxides, Aluminum compounds, Magnesium compounds, Mica, Adhesion, Surfaces, Liquid metals, Test methods.

High temperature stability, electrical properties and thermal conductivity of filled and unfilled organic resins, glasses, inorganic sheet insulation and plasma sprayed inorganic oxides have been measured to investigate their possible use as a core insulation for thermoelectric generators. Efforts have been made to reduce the thermal resistance of the various interfaces by use of thermally conducting liquids, by application of pressure and by polishing contacting surfaces. Initial experiments were conducted using

PB 160 969 $1.10

Stanford Research Inst., Menlo Park, Calif. THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 8, 1 Feb-1 Apr 60, on Contract NObs-77017. 11 Apr 60, 3p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Sulfides, Thermal conductance, Tungsten, Rhenium, Thermocouples, Production, Calibration.

Design of an experiment to measure the thermal conductivity of a cylinder of cuprous sulfide at room temperature and a few degrees above is finished. A parallel study of the liquid state has been initiated. Attempts to fabricate tungsten-rhenium couples have been made. A method of annealing and straightening the tungsten wire in an atmosphere of hydrogen above 1000°C with electrical heating has produced wires that are straight and more ductile than the commerical product. (See also PB 160 968)

PB 160 970 $1.10

Stanford Research Inst., Menlo Park, Calif. THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 9, 1 Apr-1 June 60, on Contract NObs-77017. 16 June 60, 5p. SRI Proj. no. SU-2681; AD-246 313.

DESCRIPTORS: *Thermoelectricity, *Electric power production, Copper compounds, Sulfides, *Semiconductors, Tellurides, Heat transfer, Resistance.

Attempts to observe in more detail the peak in the Seebeck coefficient of Cu2S were unsuccessful owing to container breakage and electrical shorting within the hot zone. Tests were made of the experimental method of Peltier heating of the semiconductor test specimen. This allows for determination of the thermal conductivity by passing a known current through the specimen and measuring the temperature difference between the ends, when the Seebeck coefficient and dimensions of the specimen are known. The assumption is made that the Seebeck coefficient is constant over the small temperature gradient developed (5 to 80 degrees K). A major problem encountered in the preliminary testing was the production of ohmic contacts between the current leads and the ends of the specimen. Electroplating copper on the ends of the specimen from a stirred solution of CuSO4 and H2SO4 in water at low current densities (50 to 75 milliamperes per sq cm) formed an adherent deposit. After a vacuum heat treatment at 400C for 16 hours an ohmic contact was obtained. (See also PB 160 969)

PB 160 971 $1.10

Stanford Research Inst., Menlo Park, Calif. THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 10, 1 June-1 Aug 60, on Contract NObs-77017. 17 Aug 60, 4p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Sulfides, Tellurides, Casting, Thermal conductance.

Various attempts were made by the slow cooling process to cast one-half inch diameter rods of cuprous sulfide that were free from a center hole in the top one-third of the casting. A determination was made of the thermal conductivity of cuprous sulfide in the temperature range of 25° to 400°C. (See also PB 160 970)

PB 160 972 $1.10

Stanford Research Inst., Menlo Park, Calif. THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 11, 1 Aug-1 Oct 60, on Contract NObs-77017. 11 Oct 60, 5p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Sulfides, Tellurides, Thermal conductance.

A sample of cuprous sulfide containing 10 mol percent cuprous telluride was prepared and charged into a U-tube for liquid phase measurements. The values obtained for Seebeck coefficient and resistivity were very erratic and the experiment was discontinued. The thermal conductivity of a 1.27-cm-diameter cylinder of Cu_2S (9.52 cm long) was determined within the temperature range of 25° -400°C. (See also PB 160 972)

PB 160 973 $1.10

Stanford Research Inst., Menlo Park, Calif. THERMOELECTRIC MATERIALS, by J. W. Johnson. Bimonthly progress rept. no. 14, 1 Feb-1 Apr 61, on Contract NObs-77017. 28 Apr 61, 5p. SRI Proj. no. SU-2681.

DESCRIPTORS: *Thermoelectricity, *Materials, Copper compounds, Sulfides, Electrical conductance, Resistance.

Metallic copper was added to molten cuprous sulfide, having the composition $Cu_2S_{1.016}$, in such an amount that if it all reacted the composition would be stoichiometric Cu_2S. A second run was made to which was added an excess of copper such that the solution would be saturated with respect to metallic copper at all temperatures reached during the run. Data obtained from these compositions for the Seebeck coefficient and the resistivity are presented. The Seebeck coefficient values have been corrected to platinum as a reference although graphite electrodes were used to contact the solution. Stoichiometric cuprous sulfide or cuprous sulfide containing an excess of copper have lower Seebeck coefficients than Cu_2S containing an excess of sulfur; and that the resistivity is about the same in all cases. (See also AD-259 101)

NASA N62-15113 $4.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
OPERATIONAL STATUS OF THE DEEP SPACE INSTRUMENTATION FACILITY AS OF JULY 1, 1962, by John W. Thatcher. Rept. on Contract NAS7-100. 13 Aug 62, 48p. Technical rept. no. 32-319.

NASA N62-15058 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
ORBIT DETERMINATION WITH LARGE ANTENNAS, by D. O. Muhleman. Rept. on Contract NAS7-100. 16 July 62, 19p. 3 refs. Technical rept. no. 32-248.

PB 159 022 $3.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
INORGANIC SURFACE COATINGS FOR SPACE APPLICATIONS, by M. E. Sibert. Aug 61, 34p. 15 refs. Rept. 3-77-61-12.

DESCRIPTORS: Spaceships, *Satellite vehicles, Surfaces, *Coatings, *Inorganic substances, *Paints, Ultraviolet radiation, Radiation effects, Optics, Solar energy, Absorption, Temperature control, Tests.

The development of stable, optically white coating materials for utilization as thermal-control surfaces in the space environment is described. These materials must possess extended structural, chemical, optical, and thermal stability under space conditions. Alkali-silicate-refractory-silicate compositions meet these requirements in large measure. Described also are formulation, application, and evaluation of such coatings. (Author)

PB 162 093 $2.60

Naval Ordnance Lab., White Oak, Md.
BULK COMPRESSIBILITY DATA ON SEVERAL HIGH EXPLOSIVES, by William S. Cramer. 15 Sep 56, 21p. 11 refs. NAVORD rept. 4380.

DESCRIPTORS: *Explosives, TNT, PETN, RDX, Waxes, Resonance, Tests.

Compressibility data on TNT, mixtures of Composition B and wax, and several other high explosives are presented. These data were taken at 1500 cps and room temperature by a resonant tube method. While highly precise measurements were not obtainable, analysis of the data and supplementary studies show that these data are accurate enough for many uses. (Author)

PB 162 015 $12.50

Office of the Chief of Ordnance, Dept. of the Army, Washington, D. C.
ORDNANCE ENGINEERING DESIGN HANDBOOK: PROPELLANT ACTUATED DEVICES. July 61, 173p. 33 refs. Ordnance Corps Pamphlet ORDP 20-270.

DESCRIPTORS: *Handbooks, *Ordnance, Engineering, Design, *Explosive actuators, Ejection seats, Jettisonable cockpits, Catapults, Gas generating systems, Firing mechanisms, Detents, Cartridge cases, Interior ballistics, Ballistics, Primers, Thrust, Propellants.

A short history of the development of propellant actuated devices and possible future applications of these devices are presented in Chapter 1. The following chapter describes existing devices and illustrates aircraft and missile systems in which they have been successfully used. Chapter 3 discusses the basic concepts which bear on the design of propellant actuated devices. The preliminary design and ballistic design and analysis chapters (4 and 5) are concerned with the techniques involved in designing propellant actuated devices. These chapters provide specific instructions for designing the various components and approximating and refining the ballistic charge. Chapter 6 illustrates the design techniques treated in the preceding chapters; it includes sample designs of a catapult, a time-delay initiator, and a thruster that employs an internal buffer to control the motion of its stroke. The last chapter describes the instrumentation, test fixtures, and various evaluation programs which are used in design projects.

NASA N62-15090 $1.60

Rand Corp., Santa Monica, Calif.
EFFECT OF MICROMETEORITE COLLISIONS ON SPHERICAL WIRE-MESH PASSIVE REFLECTORS, by Edward Bedrosian. Rept. on Contract NASr-21(02). Aug 62, 17p. 6 refs. Memo. RM-3274-NASA.

NASA N62-15037 $8.60

Rand Corp., Santa Monica, Calif.
AN OPTIMAL ORBITAL CONTROL PROCESS FOR A 24-HOUR COMMUNICATION SATELLITE, by J. A. Burkhart and F. T. Smith. Rept. on Contract NASr-21(02). July 62, 98p. 7 refs. Memo. RM-3255-NASA.

NASA N62-11506 $7.60

Ryan Aeronautical Co., San Diego, Calif.
PARAGLIDER RECOVERY SYSTEM FOR THE SATURN BOOSTER. Rept. on Contract NAS8-1501. 15 Aug 61, 76p.

laboratory test pieces but later evaluation is being carried out by aging in apparatus more closely simulating actual operation. (Author)

Ordnance, Missiles, and Satellite Vehicles

NASA N62-14240 $16.50

Boeing Co., Seattle, Wash.
STUDY OF LARGE LAUNCH VEHICLES UTILIZING SOLID PROPELLANTS. Final rept. vol. 1, on Contract NAS8-2438. 10 Feb 62, 253p. 10 refs. D2-20500-1.

NASA N62-14241 $6.60

Boeing Co., Seattle, Wash.
STUDY OF LARGE LAUNCH VEHICLES UTILIZING SOLID PROPELLANTS. Final rept. vol. 3 on Contract NAS8-2438. 10 Feb 62, 62p. D2-20500-3.

NASA N62-14242 $9.10

Boeing Co., Seattle, Wash.
STUDY OF LARGE LAUNCH VEHICLES UTILIZING SOLID PROPELLANTS. Final rept. vol. 5 (App. 2 to vol. 2) on Contract NAS8-2438. 10 Feb 62, 104p. D2-20500-5.

Order from GPO $2.50 as
Y 4. Ae8:N21a/963

Committee on Aeronautical and Space Sciences, United States Senate, Eighty-Seventh Congress, Second Session.
NASA AUTHORIZATION FOR FISCAL YEAR 1963. HEARINGS ON H. R. 11737, JUNE 13, 14, AND 15, 1962. 1962, 860p.

DESCRIPTORS: *Aeronautics, *Satellite vehicle research, *Research program administration, Costs.

PB 162 094 $2.60

[Feltman Research Labs.] Picatinny Arsenal, Dover, N. J.
PRELIMINARY STUDY OF M2 AND M9 PROPELLANTS BETWEEN 137°F AND -65°F, by Murray Weinstein and Arnold O. Pallingston. June 56, 30p. 11 refs. Technical rept. 2240.

DESCRIPTORS: *Propellants, *Combustion, Temperature, Pressure, Test equipment, Bombs.

Exploratory closed bomb tests were made on M2 and M9 propellants conditioned at six temperatures ranging from 137°F to -65°F. Linear burning rates at these temperatures were calculated and the burning characteristics of the propellants were correlated with the variation in conditioning temperatures. Measurements are included of the temperature coefficient of burning rate and calculated values of some thermochemical characteristics. The coefficient B, and the pressure exponent n of the burning rate equation $r = BP^n$ were calculated for each propellant at the various temperatures. The values of B show a definite temperature dependence, while the values of n show a less marked but perhaps as significant a variation.

NASA N62-14908 $2.60

Flight Research Center, National Aeronautics and Space Administration, Edwards, Calif.
A REVIEW OF IN-FLIGHT SIMULATION PERTINENT TO PILOTED SPACE VEHICLES, by Neil A. Armstrong and Euclid C. Holleman. [1962] 23p. 14 refs.

NASA N62-14933 $3.60

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
INSTRUCTION AND GUIDANCE TEXT FOR SPACECRAFT QUALITY ASSURANCE IN-HOUSE PROGRAMS, by Francis N. LeDoux. Aug 62, 39p. I-634-62-129.

NASA N62-14927 $8.60

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
MERCURY NETWORK PERFORMANCE ANALYSIS FOR MA-6, by N. R. Heller. 15 Mar 62, 100p. X-551-62-1.

NASA N62-14931 $8.60

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
MERCURY NETWORK PERFORMANCE ANALYSIS FOR MA-7, by J. C. Jackson. 14 June 62, 99p. X-551-62-53.

NASA N62-15112 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
COMMAND TECHNIQUES FOR THE REMOTE CONTROL OF INTERPLANETARY SPACECRAFT, by J. C. Springett. Rept. on Contract NAS7-100. 1 Aug 62, 20p. 20 refs. Technical rept. no. 32-314

DESCRIPTORS: Conferences, *Food, *Preservation, *Radiation effects.

The quartermaster radiation preservation of foods project
Status of overseas food irradiation programs
Present status of radiation research
Studies of the wholesomeness and nutritional adequacy of irradiated foods
Summary reports of technical sessions
(Food, 20 Nov 62)

PB 160 949 $1.10

Reliable Packing Co., Chicago, Ill.
EFFECT OF IRRADIATION ON CANNED PORK PRODUCTS, by John E. Thompson, Endel Karmas and others. Rept. no. 9 (Final), 12 July 56-11 July 61. [1961] 9p. 9 refs. File no. S-720.

DESCRIPTORS: Food, *Preservation, *Pork, Dehydrated substances, Moisture, Temperature, *Radiation effects, *Thiamine.

No significant destruction of thiamine was found in fresh, ground ham patties, freeze-dehydrated to 1% moisture and irradiated 0, 1, 2.5, and 4.5 megarads; on the other hand, a characteristic destruction pattern of thiamine was observed in both, the fresh control and completely rehydrated samples. About one third of the initial thiamine content was destroyed by the freeze-dehydration process. Fresh, ground ham was mixed with cure, canned, cooked, and irradiated at 0, 3.7, and 5.6 megarads. An untrained taste panel indicated no significant flavor preference for the non-irradiated control over the irradiated samples. Pork bellies were cured and smoked, one for 12 hours and the other for 24 hours, then sliced, canned, and irradiated at 4.5 megarads. No undesirable flavors and no destruction of smoke flavor due to irradiation were detected.

PB 160 944 $4.60

Wisconsin U., Madison.
SOME CAUSES AND EFFECTS OF MOISTURE TRANSLOCATION IN CANNED BAKED GOODS. PART I. PHYSICAL. PART II. BACTERIOLOGICAL, by K. G. Weckel and Elizabeth McCoy. Rept. no. 9 (Final), 15 Jan 59-14 July 61, on Contract DA 19-129-qm-1362. [1961] 50p. 25 refs. File no. C-322.

DESCRIPTORS: *Food, *Moisture, *Bread, Temperature, Biophysics, Hydrogen ion concentration, Freezing, Botulism.

The study of the physical chemical aspects of this project (Part 1) measured the translocation of moisture, and the changes in pH_a of canned baked bread made of doughs with different levels of moisture, and pH, when subjected to intervals of frozen storage, and subsequent thawing. The bacteriological work on this project assessed both real and potential dangers of botulism resulting from the use of the canned bread.

Packaging

PB 162 017

DeBell and Richardson, Inc., Hazardville, Conn.
TO INVESTIGATE MATERIALS FOR CONTAINERS FOR PACKAGING FOODS, by Wesley S. Larson, Hans E. Hafner, and others. Rept. no. 14 (Final), 28 Sep 56-31 Mar 59, on Investigation of Containers for Radiation Preservation of Food, Contract DA 19-129-qm-764. 15 Dec 59, 90p. File no. S-556; AD-239 523; NP-8892

DESCRIPTORS: *Containers, *Packaging, Food, Preservation, Materials, *Films, Plastics, Aluminum, Radiation effects.

The availability of plastics packaging materials and the feasibility of fabricating them into food containing packages for preservation and storage after beta and gamma irradiation-sterilization was investigated. The prescribed conditions under which the evaluations of the package would be made were primarily concerned with limitations on the oxygen and moisture permeability of the package material; with its stability after irradiation; with its durability during packaging - then irradiation - and in subsequent handling and testing; with extractables which might affect taste and odor; and with measurable toxicological factors. The study of materials showed that a number of plastic or plastic-foil combinations had most of the necessary characteristics for an acceptable package, but their immediate use was usually curtailed by a single negative factor. Solutions to many of these problems are in the course of development. Most of the packaging materials per se, were not available "off the shelf." To fill the requirements of the task, the materials and combinations thereof had to be developed -- and in this course of events, processing problems arose. The elimination of certain processing problems would provide the means of producing excellent packages. (Author)

PB 160 945 $7.60

Midwest Research Inst., Kansas City, Mo.
DEVELOPMENT OF NEW METHODS OF SEALING FLEXIBLE CONTAINERS, by B. W. Beadle, Howard W. Christie, and Howard Gadberry. Rept. no. 21 (Final) 17 Apr 57-16 July 61, on Contract DA 19-129-qm-923. 9 Oct 61, 77p. 22 refs. File no. R-331.

DESCRIPTORS: Packaging, *Seals, *Aluminum, *Foils, Laminates, Welding, *Ultrasonic equipment, Transducers, Transformers, Food.

The design and fabrication of two experimental ultrasonic welders are discussed in detail. The theory of operation and the techniques used in the design of the mechanical impedance transformers (focusing horns) in ultrasonic welders are outlined. Combined use of a rotary version of the round-jaw sealer and ultrasonic welding for closure of barrier laminates

TID-16308 $1.60

Sandia Corp., Albuquerque, N. Mex.
MEASUREMENT STANDARDS PERSONNEL TRAINING AND EVALUATION AT SANDIA CORPORATION, by M. A. Elich and H. L. Webster. 20p. SCDC-2728

PB 162 040 $4.60

Stanford Research Inst., Menlo Park, Calif.
RADAR TRACKING OF EARTH SATELLITES, by W. E. Jaye and H. D. Olson. Final rept. on Contract AF 30(602)2094. Sep 60, 45p. 2 refs. SRI Proj. 3093; RADC-TR-60-218; AD-246 374.

DESCRIPTORS: *Radar tracking, *Satellite vehicles, Radar equipment, Very high frequency, Errors, *Position finding, *Orbital flight paths, Radar echo areas, Signal to noise ratio.

Research is concerned with the radar tracking of satellites and with equipment modifications and improvements to obtain fix data that are more accurate and reliable. A description of the 106.1-Mc radar used by Stanford Research Institute in this program is presented, followed by an account of tracking requirements, operating procedure, and results. The new and improved equipment is described, as is the receiving system. (Author)

FOOD, HANDLING, AND PACKAGING EQUIPMENT

Food

PB 160 943 $1.60

Armour and Co., Chicago, Ill.
DEVELOPMENT OF RATION TYPE PORK ITEMS, by V. J. Kubala, R. E. Lewis and others. Rept. no. 6 (Final), 15 Jan 60-15 July 61, on Contract DA 19-129-qm-1541. [1961] 14p. 1 ref. File no. S-600.

DESCRIPTORS: Food, Military rations, *Pork, *Additives, *Preservation, Radiation effects

Boneless pork loins were injecto pumped with 40° brine solution, to which various compounds and solutions were added. The compounds used in these tests consisted of tripolyphosphate, mixed phosphates, sodium nitrite, isoascorbic acid, pork loin emulsion, combination of niacin, isoascorbate and dextrose, and thiamine. Solutions used were barbecue sauce and 10% vegetable extract. The loins were also injecto pumped with a barbecue sauce-brine mixture and the surface of the loins rubbed with a spice mixture containing sugar, onion powder, mono-sodium glutamate, garlic powder, white pepper, and marjoram. The best results and a product which had acceptable characteristics were obtained when a mixture of barbecue sauce and 40° base brine solution was injecto pumped into the pork loins. The loins were processed by cooking, chilling, slicing, and packing with barbecue sauce prior to irradiation. (Author)

PB 162 018 $2.60

DeBell and Richardson, Inc., Hazardville, Conn.
TO INVESTIGATE MATERIALS FOR CONTAINERS FOR PACKAGING, by Wesley S. Larson, Hans E. Hafner, and others. Rept. no. 12 (Progress), 28 Sep-28 Nov 58, on Investigation of Containers for Radiation Preservation of Food, Contract DA 19-129-qm-764. 23 Dec 58, 29p. File no. S-556; AD-220 484.

DESCRIPTORS: *Food, *Containers, Preservation, *Radiation effects, *Permeability.

Emphasis has been concentrated on four targets: (1) the construction of prototype pouches using the specially designed multilayer laminate of tissue, polyethylene, aluminum and Videne; (2) the construction of prototype cans using Videne stretch-laminated aluminum; (3) follow up on use of nylon for pouches and vacuum formed containers and associated problems; and (4) evaluation of results of completed tests, irradiated samples, test packages and new materials. (Author)

PB 160 946 $3.60

Quartermaster Food and Container Inst. for the Armed Forces, Chicago, Ill.
COMPRESSION OF DEHYDRATED FOODS. REVIEW OF LITERATURE, by Mokhtar M. Hamdy. May 61, 34p. 33 refs. Library Bulletin no. 5.

DESCRIPTORS: *Food, Preservation, *Dehydrated substances, Bibliography.

This review covers all the work that has been carried out on the compression of dehydrated foods in the U. S. A., Canada, Australia and the United Kingdom. The advantages in compressing dehydrated food into blocks or bars were cited, as well as the problems which have been confronting all researchers in this field of investigation. Some of the major problems are mentioned for consideration in the experimental stage; e.g., the fragility of product, the effect of heat and compression on the final quality of the product. Success has been claimed in compressing some products (at different laboratories) such as cabbage; furthermore, disappointments were reported in the trials to compress other dehydrated products such as potatoes. The objectives of this study are to investigate the factors which affect the compression of selected dehydrated foods, and to develop techniques for compressing these food products on a pilot scale plant. (Author)

PB 160 947 $14.50

Quartermaster Food and Container Inst. for the Armed Forces, Chicago, Ill.
PROCEEDINGS, SEVENTH CONTRACTOR'S MEETING, QUARTERMASTER CORPS RADIATION PRESERVATION OF FOOD PROJECT; CHICAGO, ILLINOIS, 6-8 JUNE, 1961. [1961] 211p. 52 refs. QMF & CI rept. no. 14-61.

PB 162 039 $3.60

Detroit Arsenal, Center Line, Mich.
DEVELOPMENT OF ROADWHEEL RETREADING TECHNIQUES, by Andrew J. White and Samuel Miller. Final rept. 28 Aug 59, 34p. Rept. no. 4506; AD-226 717.

DESCRIPTORS: *Roadwheels, Maintenance, *Rubber, Molding, Vulcanization, *Adhesives, Test equipment, Thermocouples.

Procedures and techniques were developed for rebuilding roadwheels to meet test requirements of MIL-T-3100A, dated 6 September 1957. Success depended on adequate rubber to rubber and rubber to metal adhesion. Twenty-two 26 x 6 roadwheels were retreaded with nine different cements. A cold knife was used to cut splice ends; mechanical stitching was eliminated; tread stock was cemented into a ring which was then slipped over roadwheel. All 22 tires were drum tested for 48 hours and then examined. None of the tires showed any sign of separation of rubber from rubber at the splice or rubber from metal on roadwheel. Roadwheels that met test requirements of specification MIL-T-3100A were built by the procedures described. (Author)

PB 162 090 $3.60

Ordnance Tank-Automotive Command, Detroit, Mich.
STRESSES AND DEFORMATIONS UNDER OBLIQUE LOADS, by Ervin Hegedus. Nov 61, 37p. 8 refs. Rept. no. RR-48; LL-70.

DESCRIPTORS: *Soils, *Elasticity, Theory, *Trafficability, Stresses, Deformation, Load distribution.

This study is concerned with the application of the elastic theory to soils. The stress and displacement functions were derived for the conditions that result when a finite length of load acts on the boundary of a semi-infinite soil mass. The study is based on the Theory of Elasticity, and the law of superposition is applied in the establishment of the analytical equations. Furthermore the experiment performed indicates the limitations of the elastic theory applied for the solution of such problems in the mechanics of soils. The application of the elastic theory to soils in order to define stresses and deformations is generally accepted in the foundation engineering practice. At present there are no better, more accurate means available for the computations of these quantities. However, the soil like other structural material possesses elastic properties within certain limits of loading and deformation; that is, it partly regains its original shape with the removal of forces. For deformations beyond the elastic limit the analysis is of some practical value since it furnishes qualitative information about the nature of stress-deformation distribution in the foundation. However, for exact solutions beyond the linear force-deformation range, inelastic theory will be required. (Author)

PB 162 062 $4.60

Army Ballistic Missile Agency [Huntsville] Ala.
SPECTRAL EMISSIVITIES AND SOLAR ABSORPTIVITIES, by Klaus Schocken. 1 Sep 58, 45p. 4 refs. Rept. no. DV-TN-72-58.

DESCRIPTORS: *Materials, Metals, Alloys, Plastics, Laminates, *Absorption, Reflection, *Solar energy, *Spectrographic data, Thermal radiation.

Experimental methods are explained for determining spectral emissivities and solar absorptivities of various kinds of materials, and the results are tabulated in this report. (Author)

PB 162 087 $1.10

Bendix Products Div., Bendix Corp., South Bend, Ind.
SERVICES TO GENERATE BASIC ENGINEERING DATA ON THE BEHAVIOR OF PLASTIC COMPOSITE STRUCTURES UNDER VARIOUS CONDITIONS OF STRESS, by F. P. Weldy. Periodical summary letter no. 1, 1-31 Mar 61, on Contract NOw-61-0488-c-(FBM). 4 Apr 61, 4p.

DESCRIPTORS: *Plastics, Structures, Behavior stresses, Glass textiles, *Resins, *Pressure vessels, Insulating tapes, Insulating materials, Test methods, Test equipment.

TID-15981 $2.60

General Electric Co., Cincinnati, Ohio.
CONDUCTIVITY INDUCED IN SOLID INSULATING MATERIALS DURING GAMMA IRRADIATION, by Gerald C. Huth. [1958] 21p. 6 refs.

PB 160 914 $1.60

Paint and Plastics Lab., Norfolk Naval Shipyard, Portsmouth, Va.
FORMULATION AND EVALUATION OF SHIP BOTTOM PAINTS WITH VEHICLES CONTAINING SARAN RESIN, by J. L. Lewis. Rept. on Research and Development of Protective Coatings for Ships. 12 Apr 57, 19p. Research and development rept. no. N57-18; AD-205 499.

DESCRIPTORS: *Antifouling coatings, Paints, Ship hulls, *Plastic paints, Resins, Vinyl chlorides.

Effective antifouling paints have been made with vehicles containing Saran F-120 and Saran-rosin combinations. In fouling resistance they were superior to a standard vinyl-rosin coating (F-121), and compared favorably with oleoresinous cold plastic paint (F-105). Fouling results with the Saran paints were less erratic than those obtained for the vinyl material, and film

were investigated. Combined use of the rotary round-jaw sealer and ultrasonic welding failed to produce the desired weld between the aluminum foil layers of three-layer barrier laminates. The use of motional impedance diagrams proved to be an excellent tool for determining the optimum configuration of the mechanical transformer (focusing horn) and welding disc used in the ultrasonic welders. The second experimental welder produced strong welds of three (0.001, 0.003 and 0.005 in.) aluminum foils. The peel strengths of the welds were considerably less than the strength of the foils. Shear strengths approached the tensile strength of the foils. (Author)

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

Engines and Propulsion Systems

NASA N62-10217 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PERFORMANCE OF NUCLEAR-ELECTRIC PROPULSION SYSTEMS IN SPACE EXPLORATION, by Evelyn W. Speiser. Rept. on Contract NASw-6. 15 Dec 61, 15p. 6 refs. Technical rept. no. 32-159.

NASA N62-14332 $9.60

Aerojet-General Corp., Azusa, Calif.
A DESIGN STUDY OF CONTROLLABLE THRUST LIQUID ROCKET ENGINES, by G. A. Coultas, J. T. Sings and others. Final rept. 15 Oct 61-15 Feb 62, on Contract NAS5-1019. 30 Mar 62, 120p. Rept. 2248(Final)

PB 162 089-1 $1.10

Aerojet-General Corp., Azusa, Calif.
INVESTIGATION OF STRESS-CORROSION CRACKING OF HIGH-STRENGTH ALLOYS, by R. B. Robinson, A. Rubin, and R. J. Uzdarwin. Quarterly rept. no. 1, 1 July-30 Sep 60, on Contract DA 04-495-ORD-3069. 21 Oct 60, 9p. Rept. no. 0414-01-1; AD-245 514.

DESCRIPTORS: *Rocket cases, Rocket motors, Materials, *Corrosion, *Steel, *Stainless steel, *Stresses, Fracture (Mechanics), Alloys, *Titanium, Microstructure, Corrosion inhibition.

The susceptibility to stress-corrosion cracking of rocket motor case materials is being studied. Specimens of AMS-M255 alloy (7.300-in. long) were stressed to obtain a stress of 175,000 psi with a 7.000-in. fixture span. Specimen-to-specimen constancy of the strain value, as well as any decrease of strain with time, was determined. Tatnall C6-141 foil-type strain gages were used to check the calculated strain in the stressed specimens at the point of maximum stress; the net average strain ranged from 6025 to 9020-microin./in. The stress was maintained without change for 4 days.

PB 162 089-2 $2.60

Aerojet-General Corp., Azusa, Calif.
INVESTIGATION OF STRESS-CORROSION CRACKING OF HIGH-STRENGTH ALLOYS, by R. B. Robinson and R. J. Uzdarwin. Quarterly rept. no. 2, 1 Oct-31 Dec 60, on Contract DA 04-495-ORD-3069. 23 Jan 61, 22p. 1 ref. Rept. no. 0414-01-2; AD-250 479.

DESCRIPTORS: *Corrosion, *Stresses, Fracture (Mechanics), Steel, Stainless steel, *Rocket cases, Titanium alloys, Microstructure, Rocket motors, Corrosion inhibition.

Progress is reported in the preparation of specimens for stress-corrosion testing. Materials include Ladish D6AC, Type 300M, Voscojet 1000 alloy steels, AM355 and PH 15-7Mo stainless steels, and B120VCA Ti alloy. Microstudies were made on the Vascojet 1000 Type 300M, and Ladish D6AC alloy steels to determine the extent of decarburization and the general structure of each material. When the vender-recommended tempering temperature of 950 F for Vascojet 1000 failed to produce the expected yield strength of 240 ksi, lower temperatures were investigated, and 925 to 950 F was chosen as the optimum for maximum yield strength. Because of the gage of the material (0.032 in.), the B120VCA Ti alloy will be tested in 4-in. bent-beam holders instead of the 7-in. holders which will be used for the other materials. (See also PB 162 089-1)

NASA N62-14259 $1.60

Electro-Optical Systems, Inc., Pasadena, Calif.
CONDENSER HEAT REJECTION SYSTEMS, by Lance Hays. Monthly progress rept. 1 Mar-1 Apr 61, on Contract NAS7-11. 7 Apr 61, 12p. 1 ref. EOS-588-ML-5.

NASA N62-14260 $1.60

Electro-Optical Systems, Inc., Pasadena, Calif.
CONDENSER HEAT REJECTION SYSTEMS, by Lance Hays. Monthly progress rept. 1 May-1 June 61, on Contract NAS7-11. 10 June 61, 12p. 2 refs. EOS-1588-ML-7.

NASA N62-14262 $1.60

Electro-Optical Systems, Inc., Pasadena, Calif.
CONDENSER HEAT REJECTION SYSTEMS, by Lance Hays. Monthly progress rept. 1 July-1 Aug 61, on Contract NAS7-11. 7 Aug 61, 13p. 1 ref. EOS-1588-9.

PB 162 033 $8.60

Beech Aircraft Corp. [Wichita, Kans.]
FLOW THEORY DEVELOPMENT FOR A CRYOGENIC LIQUID, by C. W. Spieth, R. J. Corbett and others. Rept. on Contract AF 33(616)5178. Sep 58, declassified 14 Apr 59, 91p. 3 refs. WADC Technical rept. 58-529; AD-214 257.

DESCRIPTORS: *Cryogenics, Liquids, *Liquid rocket propellants, Fluid flow, *Spaceships, Rocket propulsion, Tests.

The use of SF-1 as a fuel for a space vehicle will require a test proven transfer design method for the lines connecting the components of the propulsion system. Provisions were made to provide the propulsion system engineer with the required test data, theoretical study, and design methods. If the design methods are properly applied, functional, economical SA-1 transfer lines can be obtained. A theoretical approach is provided to single-phase flow with a discussion of the thermal and frictional factors involved. The test apparatus is described and the raw data obtained from the test program is presented. The theoretical approach and the experimental data were compared and the relationships correlated. The propulsion system engineer is provided with a handbook type treatment for use in the design of SF-1 transfer systems. The test data for small line sizes was extrapolated to the line sizes required for large flow systems. Recommendations are presented to guide the designer in the selection of an optimum transfer system. (Author)

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I 28.3:581/pt. 1

Bureau of Mines, Washington, D. C.
INDEX OF SELECTED GASIFICATION PATENTS. I. UNITED STATES PATENTS, comp. by Simon Klosky. 1960, 267p. 6 refs. Bulletin 581.

DESCRIPTORS: *Coal gas, Production, *Patents, *Indexes, *Gases

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Bureau of Mines, Washington, D. C.
INDEX OF SELECTED GASIFICATION PATENTS. II. UNITED KINGDOM, AUSTRALIAN, CANADIAN, AND SOUTH AFRICAN PATENTS, comp. by Simon Klosky and Zane E. Murphy. 1962, 579p. 6 refs. Bulletin 581.

DESCRIPTORS: *Coal gas, Production, *Patents, *Indexes, *Gases.

PB 162 035 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE THERMAL DECOMPOSITION OF HYDRAZINE, by D. D. Thomas Rept. on Contract W04-200-ORD-1482. 6 Aug 47, declassified. 24p. Progress rept. no. 9-14 [ATI-41 019].

DESCRIPTORS: *Rocket propellants, *Hydrazines, Pyrolysis, Reaction kinetics, Catalysis, Phase studies.

For hydrazine heated in a closed system, no definite temperature can be stated as that point above which thermal decomposition begins. Liquid hydrazine, on vaporizing in an isothermal system in the presence of an excess of the liquid below 500°F, decomposes at a relatively slow and predictable rate which is dependent on temperature. The products are ammonia and nitrogen. Above 500°F, hydrazine decomposes into ammonia; the ammonia partly decomposes further into nitrogen and hydrogen. At temperatures considerably higher than 500°F the end products are predominantly nitrogen and hydrogen containing little ammonia. The reaction is wall-catalyzed apparently, both in the liquid and the vapor phases. The reaction is specifically catalyzed by the addition of strong acids to the liquid. (Author)

NASA N62-14358 $1.10

Princeton U., N. J.
[LINEAR AND NONLINEAR LIQUID ROCKET COMBUSTION INSTABILITY RESEARCHES] by Luigi Crocco. Quarterly status rept. 1 Sep-30 Nov 61, on Grant NsG-99-60 and Contract NOw-61-0686-d. 1 Dec 62, 4p.

Leather and Textiles

PB 160 948 $1.60

Quartermaster Research and Engineering Command, Natick, Mass.
THE EFFECT OF SAMPLE WEIGHT ON THE HEAT TRANSFER AND IGNITION CHARACTERISTICS OF A SERIES OF 60/40 COTTON/NYLON BLENDS, by E. T. Waldron. Nov 61, 13p. 7 refs. Textile Functional Finishes rept. no. 196.

DESCRIPTORS: *Cotton textiles, *Nylon, Cotton mats, *Heat transfer, *Ignition, Optical analysis.

The heat transfer and ignition characteristics of a series of cotton/nylon mats containing 40% nylon were studied. It is shown that resistance to heat transfer and ignition increases with the weight of the mat and it is concluded that the greatest increase in efficiency would be realized in increasing the weight of a summer fabric from 5.2 to 6.5 oz/yd^2. (Author)

PB 162 047 $7.60

Scientific Oil Compounding Co., Chicago, Ill.
DEVELOPMENT OF EFFECTIVE NON-TOXIC FLUORINATED FUNGICIDAL FORMULATIONS FOR COTTON MATERIALS, by Charles C. Yeager and Jay C. Chapin, Rept. for June 57-July 58, on Finishes and Materials, Contract AF 33(616) 5322. Oct 58, 71p. 1 ref. WADC Technical rept. 58-303; AD-203 525.

properties in general were good. Saran-rosin boot-topping paint was not as resistant to corrosion as oleoresinous F-146/50 or experimental vinyl-alkyd or vinyl-rosin combinations, but it was not greatly inferior to these products. Saran resin was used successfully in metal pretreatment and anticorrosive formulations, but to no measurable advantage. Storage stability for these primers was good, but it was poor for the antifouling coatings. Slow film build-up with Saran coatings presented a disadvantage. The use of dioctyl phthalate to correct small film defects produced no calculable result on the effectiveness of Saran coatings. (Author)

NASA N62-14222 $6.60

Rocketdyne, Canoga Park, Calif.
COMPATIBILITY OF MATERIALS WITH HIGH TEMPERATURE POTASSIUM, by R. B. Dillaway. Quarterly progress rept. no. 3, 1 Nov 60-31 Jan 61, on Contract NAS5-453. 3 Mar 61, 62p. Rept. R-2617-3.

TID-16310 $1.10

Sandia Corp., Albuquerque, N. Mex.
MATERIALS AND PROCESSES FOR CONTACT RELIABILITY, by Lewis K. Jones. 5p. SCDC-2684.

TID-16358 $2.60

Tennessee U. Engineering Experiment Station, Knoxville.
THE BEARING SEAL. A DESIGN EVALUATION, by William K. Stair. Rept. on Subcontract 2118. Apr 62, 30p. 18 refs. ME-5-62-TN-2.

Ceramics and Refractories

ORO-579 $4.60

Carborundum Co., Niagara Falls, N. Y.
SYNTHESIS AND FABRICATION OF REFRACTORY URANIUM COMPOUNDS, by K. M. Taylor and C. H. McMurtry. Summary rept. 1 Jan 61-15 Mar 62, on Contract AT(40-1)-2558. May 62, 47p. 1 ref.

PB 162 064 $2.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
EVALUATION OF THE SHARPLES MICROMEROGRAPH FOR PARTICLE SIZE DISTRIBUTION ANALYSIS, by Seymour M. Kaye, Doris E. Middlebrooks, and Garry Weingarten. Feb 62, 29p. 4 refs. Technical rept. FRL-TR-54.

DESCRIPTORS: *Glass, *Particles, Sizing, Measurement, Microanalysis, Air, Sedimentation, Instrumentation.

The Sharples Micromerograph in use in the Pyrotechnics Laboratory at Picatinny Arsenal does not properly evaluate either the coarse or the fine ends of the particle size distribution curve for a sub-sieve spherical glass bead sample. The bias at the coarse end is due to preferential holdup of coarser particles in the sedimentation column, while at the fine end a portion of the fine particles deposited are not recorded. This nonrecording of fine particles is not due to the insensitivity of the balance-recorder system, but is the result of errors inherent in the standard template furnished with the instrument. It is concluded that although the Sharples Micromerograph is suitable for control purposes where reproducibility of results is of prime importance, its use as a research tool for obtaining absolute particle size data is questionable. (Author)

PB 160 940 $1.60

Vallecitos Atomic Lab., Pleasanton, Calif.
THERMIONIC CATHODE MATERIALS PROPERTIES, by L. N. Grossman, A. Kaznoff, and E. Hoyt. Progress rept. no. 2. 15 Apr 62, 11p. 8 refs. ARPA Order 219-61, Task #2.

DESCRIPTORS: Thermionic converters, *Cathodes, *Materials, *Thermionic emission, Measurement, Refractory materials, Borides, Carbides, Brittle materials, Mechanical properties, Plastic flow, Crystallization, Fracture (Mechanics), Stresses, Thermal conductivity.

This report describes the progress of an experimental study of properties of emitter materials which are likely to find application in thermionic converters. The materials being studied include ZrC, UC, $(Zr_{0.5}, U_{0.5})$ C, ThC, ThC_2, EuB_6, and YB_6.

Fuels, Lubricants, and Hydraulic Fluids

PB 162 029 $14.50

Beech Aircraft Corp., Boulder, Colo.
DEVELOPMENT OF POSITIVE EXPULSION SYSTEMS FOR CRYOGENIC FLUIDS, by C. W. Spieth, Final rept. on Phase 1, 15 Jan 60-15 Jan 61, on Contract AF 33(616)6930. [1961] 211p. Engineering rept. no. 9501; AFFTC-TR-60-70; AD-250 138.

DESCRIPTORS: *Cryogenics, Liquid rocket propellants, *Propellant tanks, Liquefied gases, Hydrogen, Weightlessness, Plastics, Containers, Fluids, Materials, Design, Liquids, Gravity, Ejection.

This document describes work pertaining to tanks capable of expelling cryogenic liquids under a zero g environment. The areas of effort included the analysis of various capacity tank systems and the methods of expelling the fluids.

PB 162 045-1 $5.60

Armour Research Foundation, Chicago, Ill.
ADVANCED STUDIES OF COMPUTER PROGRAMMING, by E. S. Schwartz. Quarterly rept. no. 1, 15 June-14 Sep 59, on Contract DA 36-039-sc-78931. 15 Oct 59, 58p. 28 refs. ARF Proj. E121; AD-230 393

DESCRIPTORS: *Digital computers, *Programming, Errors, Data transmission systems, Data storage systems, Circuits, Language, Coding.

Man-computer relationships in a FIELDATA environment are reviewed. Techniques are evaluated and formalized to increase the ease, speed, and accuracy in communicating with a computer. Analysis is made of the suggested automatic programming system, and general criteria for the utilization of programming techniques are listed. The outline of an English language clerical compiler is presented based upon a study of projected ADPS uses. Program debugging routines are studied and the outlines of a comprehensive debugging system are presented for console debugging. Techniques are investigated for automatically detecting and correcting program errors based upon topological and/or logical relationships of program subunits. (Author)

PB 162 045-2 $4.60

Armour Research Foundation, Chicago, Ill.
ADVANCED STUDIES OF COMPUTER PROGRAMMING, by E. S. Schwartz. Quarterly rept. no. 2, 15 Sep-14 Dec 59, on Contract DA 36-039-sc-78931. 15 Jan 60, 44p. .4 refs. ARF Proj. E121; AD-234 660.

DESCRIPTORS: *Digital computers, *Programming, Errors, Data transmission systems, Data storage systems, Circuits, Language, Coding.

A language for a comprehensive debugging system to be used with the Mobidic family of Fieldata computers is described. Flow charts of routines for reading address fields utilizing an address processor and 6 other subroutines are detailed and explained. Study continued in investigating the properties of computer programs that may be utilized to enable the computer to serve as an active instrument in the debugging process. A computable procedure for solution of a problem is described as a set of transformation modules in a descriptive language. The ordered relations between steps of the procedures defined by the modules are described by the connection matrix of a linear graph and priority relations are described by a priority matrix. By a process of matrix multiplication, all implicit priorities are determined from given, explicit priorities. (Author) (See also PB 162 045-1)

PB 162 045-3 $5.60

Armour Research Foundation, Chicago, Ill.
ADVANCED STUDIES OF COMPUTER PROGRAMMING, by E. S. Schwartz. Quarterly rept. no. 3, 15 Dec 59-14 Mar 60, on Contract DA 36-039-sc-78931. 15 Apr 60, 52p. .2 refs. ARF Proj. E121; AD-239 632.

DESCRIPTORS: *Digital computers, *Programming, Errors, Data transmission systems, Data storage systems, Circuits, Language, Coding.

Flow charts and descriptions of 10 additional subroutines for a comprehensive debugging system being prepared for the MOBIDIC family of FIELDATA computers are presented. The flow charts include SEARCH, TRANSFER, INSERT, TRACE, and GENERAL INTERPRETATION routines. Output routines for TYPE, PUNCH, PRINT, and DUMP operations using output conversion procedures associated with MODE designators are also described. These charts, together with the ADDRESS PROCESSOR and six associated subroutines, comprise the essential routines required by the debugging system. Studies continued on investigating the network properties of computer programs. Considering a flow chart as a linear graph, a connection scheme is used employing the Poincare-Veblen oriented matrix and a precedence matrix to describe the topological characteristics of the program. This program description is studied as an aid in program analysis. A procedure for deriving a connection matrix from a decomposition of the object program is also outlined for comparison with the connection matrix describing the flow chart. Utilization of the matrices as aids in parallel-programming is being investigated. (Author) (See also PB 162 045-2)

PB 162 045-4 $12.00

Armour Research Foundation, Chicago, Ill.
ADVANCED STUDIES OF COMPUTER PROGRAMMING, by E. S. Schwartz. Quarterly rept. no. 4, 15 Mar-14 June 60, on Contract DA 36-039-sc-78931. 15 July 60, 167p. ARF Proj. E121; AD-245 729.

DESCRIPTORS: *Digital computers, *Programming, Handbooks, Coding, Errors, *Data processing systems, Instruction manuals, Language, *Data storage systems.

A description and user manual for the MOBIDIC Program Debugging System is presented together with detailed flowcharts and program listings of 30 subroutines coded in the MOBIDIC Assembly Program (MAP) language. The Debugging System is designed for use at the console of a MOBIDIC computer using either paper tape or an on-line typewriter for input. The routines have been designed to be referenced interpretively by a small vocabulary of commands. Commands include trace, breakpoint, nobreak, shapshot, search, insert, transfer, run, and output commands. The dump command produces a self-loading paper tape; punch produces an output in Fieldata code for off-line typewriter printing; the type command uses the on-line supervisory typewriter for output. Constants may be entered in any one of six modes including octal, decimal, fractional, floating point, alphabetic and instruction. The mode command controls the format used by the output commands. The Debugging System is compatible with programs written in either machine or symbolic language. The interpretive system and flexible format for control lines make possible the addition of other general or special-purpose commands as may be required. (Author) (See also PB 162 045-3)

DESCRIPTORS: *Fungicides, *Cotton textiles, Fluorination, *Coatings, *Fungusproofing.

Methods of formulating 2, 2'-dihydroxy 5, 5'-difluorodiphenyl sulfide (DDFDS) were investigated with the purpose of developing effective solvent soluble and water miscible formulations capable of producing fungicidal and fungicidal-water repellent finishes for cotton materials. Initial investigations included studies on the solubility of the fungicide in a wide range of solvents and storage stability of the resulting concentrated solutions. A combination of hexylene glycol with with a mixture of hexyl and amyl alcohols was found to be the best for the solvent formulations. Di-isobutylketone was found to be the best for water emulsion formulations. Samples of a standard cotton sateen fabric were treated with many experimental formulations to determine their effectiveness against degradation caused by fungi and ultraviolet light. The DDFDS, when properly formulated, was found to be a very effective fungicide. However, the compound did decompose during extended, accelerated, artificial weathering. Various non-pigmented anti-oxidants and screening agents were evaluated to counteract this break-down but none were found to be wholly effective. Preliminary work indicated that stabilization of the DDFDS can be accomplished with selected amine compounds. Formulations utilizing the stabilized fungicide proved promising when used in a fabric material especially those applied from an aqueous emulsion system. (Author)

PB 162 022 $8.60

[Physical] Research [Labs.] Boston U., Mass.
PHOTOGRAPHIC MONOBATHS FOR RAPID PROCESSING, by Harry S. Keelan. Rept. on Contract AF 33(038)15615. 15 Jan 52, declassified 15 Apr 53. 94p. 17 refs. Technical note 94; AD-6058.

DESCRIPTORS: Aerial photographs, *Photographic film, Processing, *Photographic chemicals, Photographic paper.

Four monobaths (single-solution developer and fixer) were developed as a means of minimizing time, space, and equipment required for processing aerial film. The monobaths contain varying amounts of commonly used photographic chemicals, but the improvement results from the use of $NaAlO_2$ which keeps the pH constant throughout the use of the bath. The stability of the monobaths compares favorably with Dektol and D-19 developers. The main disadvantage is a 40 to 50% loss in emulsion speed. Preliminary tests indicate that this loss may be partially overcome by adding organic chemicals which will oxidize into opaque dyestuffs on the reduced Ag image particles. No one of the monobaths was suitable for all types of film and paper.

TID-16158 $1.10

St. Olaf College, Northfield, Minn.
COMMENTS ON THE USE OF "KODAK" AR.10 STRIPPING FILM IN AUTORADIOGRAPHY, by Paul R. Burton and David L. Nelson. Rept. on Contract AT(11-1)-1016. [1961] 9p. 7 refs.

MATHEMATICS

NASA N62-14923 $3.60

Automatic Control Center, Purdue U., Lafayette, Ind.
RAPID METHODS FOR THE SOLUTION OF AUTOMATIC CONTROL EQUATIONS, by James W. Moore and Rufus Oldenburger. Rept. on Grant NsG-28-59. 14 May 62, 37p. 5 refs.

NASA N62-15114 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
USE OF THE FROBENIUS SERIES IN SOLVING HOMOGENEOUS LINEAR SYSTEMS OF DIFFERENTIAL EQUATIONS WITH WEAK SINGULAR POINTS, by Russell E. Carr. Rept. on Contract NAS7-100. 27 Aug 62, 12p. 1 ref. Technical rept. no. 32-322.

PB 157 184 $21.00

Lockheed Aircraft Corp., Sunnyvale, Calif.
A TABLE OF QUADRATIC RESIDUES FOR ALL PRIMES LESS THAN 2350, by R. Kortum and G. McNiel. Oct 60, 362p. 3 refs. LMSD-703111.

DESCRIPTORS: *Number theory, *Tables.

ORNL-TM-271 $4.60

Oak Ridge National Lab., Tenn.
OR GLS, A GENERAL FORTRAN LEAST SQUARES PROGRAM, by William R. Busing and Henri A. Levy. Rept. on Contract W-7405-eng-26. 7 Aug 62, 42p.

Computing Devices

PB 160 928 $7.60

Arenberg Ultrasonic Lab., Jamaica Plain, Mass.
RESEARCH ON THE PROPERTIES OF SOLID ACOUSTIC DELAY LINES AND MEDIA FOR USE IN DIGITAL COMPUTER STORAGE. Final rept. for period ending 5 Feb 55, on Contract Nonr-73400. [1955] 80p. AD-59 423.

DESCRIPTORS: *Solid delay lines, Supersonic delay lines, Digital computers, Circuits, *Memory devices, *Data storage systems.

SCTM-51-62(72) $4.60

Sandia Corp., Albuquerque, N. Mex.
COMPLEMENTARY TRANSISTOR MEMORY CIRCUIT AND LOGIC APPLICATIONS, by Lee M. Bossart. Apr 62, 47p. 5 refs.

MECHANICS

NASA N62-14232 $1.10

California Inst. of Tech., Pasadena.
STUDY OF CYLINDRICAL SHELLS WITH LARGE RADIUS TO THICKNESS RATIOS, by E. E. Sechler. Status rept. no. 5 on Grant NsG-18-59. 27 Apr 62, 3p.

PB 160 921-1 $1.10

Institute for Fluid Dynamics and Applied Mathematics, U. of Maryland, College Park.
PHYSICAL PHENOMENA IN GAS JETS. Quarterly progress rept. no. 1, 1 Dec 51-29 Feb 52, on Contract AF 18(600)86 [continuation of Contract AF 33(038)10481]. 18 Apr 52, 10p. Rept. series no. B8. AD-3524.

DESCRIPTORS: *Jets, Physical properties, Stability, Pressure, Axially symmetric flow, Supersonic flow, Turbulence, Fluid mechanics.

An experiment was performed at 94-psi stagnation pressure, corresponding to an orifice exit pressure of 2 atm. A single fringe interferogram shows density contours which are similar to those calculated. Plane waves (500 kc) from an X-cut quartz crystal were photographed with a short duration spark. The waves seemed to decrease slightly the size of the potential core in low-speed jets. The response of the turbulence model to a harmonic function was studied. During certain phases of a turbulent process, similar oscillations seem to occur, and their amplitude is a function of thermal noise and an amplification factor determined by some slower quasi-periodic motion. The amplitude of the oscillations depends upon the amplification factor and the Reynolds number (ratio of kinetic energy of the main flow to that of the very low frequency thermal noise).

NASA N62-15116 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A METHOD FOR DETERMINING MODAL CHARACTERISTICS OF NONUNIFORM THIN CIRCULAR RINGS, by T. E. Lang and R. E. Reed. Rept. on Contract NAS7-100. 3 July 62, 28p. 6 refs. Technical rept. no. 32-252.

Aerodynamics and Pneumatics

PB 162 063 $3.60

[Army Rocket and Guided Missile Agency] Huntsville, Ala.
DESCRIPTION AND PERFORMANCE DATA FOR A PNEUMATICALLY OPERATED RAPID-RATE TENSILE MACHINE, by Richard E. Ely. 16 Jan 56, 32p. 11 refs. Rept. no. 2R9P.

DESCRIPTORS: *Pneumatic systems, *Tensiometers, Design, Tests, Polymers, Propellants, Tensile properties.

A pneumatically operated rapid-rate tensile machine is described. Performance tests have revealed that polymeric tensile specimens can be ruptured in periods of one to ten milliseconds with a nearly constant crosshead rate. Elongation histories were obtained from high-speed film records. Ultimate loads of 2000 lbs have been electronically measured. (Author)

PB 162 032 $6.60

Hermann Föttinger Institut, Berlin (West Germany)
VORTEX MOTION AND TURBULENCE OF FREE JETS IN STEADY FLOW, by U. Domm and O. Wehrmann. Final rept. 1 Dec 53-30 Nov 54, on Contract AF 61(514)629-C. 30 Nov 54, 67p. 12 refs. [AF]OSR-[TR]-55-118; AD-76 722.

DESCRIPTORS: *Jets, Motion, Turbulence, *Vortices, Laminar boundary layer, Boundary layer, Anemometers, Low pressure research, Instrumentation, Design, Operation, *Turbulent flow.

The design and operation of a low-pressure chamber containing the free jet is described. Hot-wire measuring techniques have been applied for determining velocity-distributions and vortex-frequencies. The problem of hot-wire calibration at low free stream velocities has been treated using three methods. A comparative study proved that the stable vortex frequency behind cylindrical bodies is the best means for calibrating hot-wires at low velocities. Hot-wire measurements had the result that in the range of the Reynolds-Number $1830 < Re < 4700$ the free jet in the neighbourhood of the nozzle has a periodic structure in time and in space as function of the velocity. A description is given of the newly developed hot-wire instrument equipped with automatic control of the constant temperature of the hot-wire and having a linearization stage for the signal. (Author)

Hydrodynamics, Hydraulics, and Hydrostatics

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Geological Survey, Washington, D. C.
FLOW CHARACTERISTICS OF ELKHORN RIVER NEAR WATERLOO, NEBRASKA. STUDIES OF FLOW IN ALLUVIAL CHANNELS. by E. W. Beckman and L. W. Furness. 1962, 39p. 5 refs. Geological Survey Water-Supply paper 1498-B.

PB 162 045-5 $3.60

Armour Research Foundation, Chicago, Ill.
ADVANCED STUDIES OF COMPUTER PROGRAMMING, by E. S. Schwartz. Quarterly rept. no. 5, 15 June-14 Sep 60, on Contract DA 36-039-sc-78931. 15 Oct 60, 40p. 2 refs. ARF Proj. E121; AD-248 222.

DESCRIPTORS: *Digital computers, *Programming, Errors, Data transmission systems, Language, Coding, Matrix algebra.

An automatic sequencing procedure for assigning sets of instructions to predesignated autonomous units of a multi-processor is described. Six generalized rules are derived for the procedure which proceeds directly to a solution without obtaining and testing the total set of permutations on the instruction sets, and seeks to establish a sequence of operations to minimize the total operation time while satisfying all precedence restrictions. The procedure is readily adaptable to computer operation and automatic development of the assignment matrix is described. The solution obtained is guaranteed to be feasible although it is not necessary unique. In the examples tested, solution was obtained. (See also PB 162 045-4)

PB 162 046 $9.60

Armour Research Foundation, Chicago, Ill.
ADVANCED STUDIES OF COMPUTER PROGRAMMING, by E. S. Schwartz. Final rept. for 15 June 59-15 Dec 60, on Contract DA 36-039-sc-78931. 15 Jan 61, 118p. 21 refs. ARF Proj. E121; AD-251 951.

DESCRIPTORS: *Digital computers, *Programming, Errors, Data transmission systems, Data storage systems, Circuits, Language, Coding.

Three major areas of advanced programming are discussed in an evaluation and formalization of techniques to facilitate communication between man and computer, with emphasis on error control. An executive system for a MOBIDIC computer installation is outlined and several basic functions are described. The MOBIDIC Program Debugging System, a set of 30 routines for use at the computer console for debugging a program, is reviewed. A theoretical study of the properties of computer programs that may be employed to utilize a computer as an active instrument in the debugging process is made. (Author) (See also PB 162 045-5)

AD-273 347 repriced $5.00

California U., Los Angeles.
AN INVESTIGATION OF SAMPLED DATA MODELS OF THE HUMAN OPERATOR IN A CONTROL SYSTEM, by George A. Bekey. Doctoral thesis. Final rept. on Contract AF 33(616) 7139. May 62, 360p. 201 refs. Rept. no. 62-6; ASD-TDR 62-36.

DESCRIPTORS: Mathematical computer data, *Human engineering, *Radar operators, Behavior, Tracking, Radar tracking, Control systems, Computers, Linear systems, Nonlinear systems, Statistical analysis.

An analytical and experimental study of a new class of human operator models, based on discrete rather than continuous operations is presented. A systematic study of the implications of intermittency by means of the theory of sampled-data control systems is described. The resulting models are consistent with the large body of experimental evidence concerning tracking. For the inputs considered, the outputs from the sampled-data models have certain characteristics which approximate experimental data more closely over a wider range of frequencies than those obtained from the quasilinear continuous models. Systematic procedures for construction of the proposed sampled-data model are presented, beginning with the measurement of power spectra and cross-spectra of the system. A preliminary analysis of transient response and stability of sampled data systems with variable sampling rates is presented as an introduction to the study of adaptive sampled-data models. (Author)

TID-16302 $4.60

Digital Computer Lab., U. of Illinois, Urbana.
CIRCUIT RESEARCH PROGRAM (PART I). MATHEMATICAL METHODS (PART II). DATA REDUCTION METHODS (PART III). ILLIAC USE AND OPERATION (PART IV). IBM 650 USE AND OPERATION (PART V). INSTRUCTIONAL USE OF COMPUTERS (PART VI). CONTROL DATA CORPORATION 1604 (PART VII). GENERAL LABORATORY INFORMATION (PART VIII). May 62, 44p.

PB 158 939 $3.60

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
A REVISED MISTAKE DIAGNOSIS ROUTINE, by John F. Walsh. Rept. on Contract AF 33(616)5477. Aug 59, 37p. Technical memo. 7849-TM-6.

DESCRIPTORS: *Digital computers, Diagnosis, Programming, *Errors, *Corrections.

A mistake diagnosis routine is a digital computer program or routine to aid in the diagnosis of mistakes in other programs. This report describes such a routine, developed for use on the Whirlwind I computer of M.I.T., which permits interruption of a program at specified points. At these points, pertinent information is printed out for checking and/or plotted for viewing, and then the normal operation of the program is resumed. The routine is automatic, general in application, and easy to set up and operate. (Author)

NASA N62-14935 $8.60

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
DUAL TIME SYSTEM. DATA RECOVERY SYSTEM FOR IONOSPHERIC D-REGION ROCKET PROGRAM. May 62, 93p. I-563-62-7.

sintering methods and the chemical reactivity of molybdenum with such materials as graphite, uranium compounds, metallic carbides, and refractory metals. Comparatively little information was found available which would apply to the fabrication of high density molybdenum compacts containing up to 10% by weight of a uranium compound by pressing and sintering methods within a temperature range of 1100° to 2100°C (2012° - 3812°F). (Author)

PB 162 091 $2.60

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
METHODS FOR ANALYSIS OF BERYLLIUM CARBIDE, by W. L. Bridges, Earl S. Funston, and Sherman A. Reed. 21 Mar 49, declassified 29 Nov 61. 24p. 1 ref. Rept. no. NEPA 940-SCR-40.

DESCRIPTORS: *Beryllium compounds, *Carbides, Chemical analysis, Impurities, Carbon, Moisture, Nitrogen, Oxides, Dioxides, *Silicon compounds, *Beryllium, Metals, Separation, Metallurgy, Test equipment.

Analytical methods are given for determining the composition and impurities of beryllium carbide. A summary of the experimental work leading to these procedures and supporting data are also presented. Analytical procedures for the determination of free and combined carbon, moisture, nitrogen, beryllium oxide, silica, iron, total beryllium, and beryllium metal are outlined. Diagrams of special apparatus used are included. (Author)

NMI-2106 $1.60

Nuclear Metals, Inc., Concord, Mass.
FUNDAMENTAL AND APPLIED RESEARCH AND DEVELOPMENT IN METALLURGY. Progress rept. for Apr 62, on Contract AT(30-1)-2784. 23 July 62, 18p. 1 ref.

TID-15819 $2.60

Pittsburgh U., Pa.
STUDIES OF ALLOY FORMATION, by W. E. Wallace. Annual rept. 15 May 61-15 May 62, on Contract AT(30-1)-647. 28p. 39 refs.

TID-15836 $3.60

Syracuse U., N. Y.
INVESTIGATION OF SPECIFIC VOLUMES OF LIQUID METALS AND ALLOYS, by Frank A. Kanda and Douglas V. Keller. Rept. no. 1 on Contract AT(30-1)-2731. May 62, 36p. 7 refs.

Ferrous Metals

ORNL-TM-299 $1.60

Oak Ridge National Lab., Tenn.
AN ESTIMATE OF THE EFFECT OF NEUTRON ENERGY SPECTRUM ON RADIATION DAMAGE OF STEEL, by H. C. Claiborne. 27 July 62, 15p. 7 refs.

PB 162 088 $1.60

Watertown Arsenal Labs., Mass.
FRACTURE TOUGHNESS OF AISI 4340 STEEL AS A FUNCTION OF PRIOR AUSTENITE GRAIN SIZE, by Robert N. Katz. Dec 61, 12p. 5 refs. Technical note WAL TN 320.1/8.

DESCRIPTORS: Guided missiles, Rocket cases, *Steel, Fracture (Mechanics), *Austenite, Grains (Metallurgy), Heat treatment, Tensile properties, Mechanical properties, Phase transitions.

This report covers an investigation of the plain strain fracture toughness (G_{ic}) of AISI 4340 steel as a function of testing temperature for material heat treated at two austenitizing temperatures (1550 and 2300 F) and two tempers (400 and 200 F). The fracture toughness, G_{ic} (in-lb/sq in.), was obtained from circumferentially notched round tensile bars. It was found that increasing the austenitizing temperature (and thus prior austenite grain size) in lightly tempered AISI 4340 steel increased fracture toughness at a given test temperature. A transition in fracture toughness was observed at about -150 F for the high austenitizing temperature and 400 F temper, but could not be established for the other heat treatments. (Author)

Light Metals

PB 162 058 $8.10

Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF IMPROVED METHODS FOR COLD EXTRUSION OF TITANIUM, by R. J. Fiorentino, A M. Sabroff and P. D. Frost. Final technical engineering rept. 1 Feb 59-31 July 60, on Contract AF 33(600)33540. Mar 61, 85p. AMC TR-61-557; AD-251 977.

DESCRIPTORS: *Titanium, *Titanium alloys, *Extrusion, Manufacturing methods, Friction, Machine shop practice, Machine tools, Design, Precision finishing, *Nuts (Mechanics), Dies, Pressure, Phosphate coatings, Lubrication, Production, Screw threads.

Cold extrusion techniques evolved from this study were applied to the production of aircraft flare-less-tube nuts of AMS4902 Ti (commercially pure) with savings of about 58% in materials, 20% in fabrication, and 48.5% in total costs over those produced from solid bar stock. Precision hollow shapes of unalloyed Ti and Ti-3Al-2.5V alloy were backward extruded at 50% reduction at practical working pressures, with

DESCRIPTORS: *Inland waterways, *Hydraulic research, *Nebraska.

Analysis of depth-discharge relationships with changing bed configuration.

NASA N62-14860 $5.60

Michigan U., Ann Arbor.
OBSERVATIONS ON CAVITATION DAMAGE IN A FLOWING SYSTEM, by Frederick G. Hammitt. Internal rept. no. 14 on Grant NsG-39-60. June 62, 51p. 17 refs. Summary of ORA Technical rept. 03424-4-T.

PB 162 092 $11.50

Naval Ordnance Lab., White Oak, Md.
PROCEEDINGS OF THE NOL WATER ENTRY SYMPOSIUM, 1 DECEMBER 1955, comp. by Manford B. Tate. 24 Jan 56, 24p. 9 refs. NAVORD rept. 4180; AD-128 691.

DESCRIPTORS: Symposia, *Water entry, *Air to underwater, Guided missiles, *Impact shock, *Oceanography, Model tests, *Underwater propulsion, *Accelerometers, Telemeter systems, *Radiosondes, *Vibration isolators, Recording systems, *Position finding, *Theodolites

A method of Calculating the Forces upon a Body during its Entry into Water from the Atmosphere
An Application of the Modified von Karman Theory
The Specular-Momentum Phase of Water Entry
A Statistical Study of Ocean Conditions for Missile Water Entry
Basic Parameters of Water Entry Shock as Obtainable in an Elevator Propulsion Test Facility
Large-Scale Model Water-Entry Shock Measurements
Shock and Angular Acceleration and Velocity Components Computed from a Ten-Accelerometer Measuring System
A Radio-Sonde for Water-Entry Shock Measurement
A Recorder Shock Mount
A Photogrammetric Theodolite System for Finding Missile Initial Position and Velocity at Water Entry

METALLURGY

DC-61-6-29 $1.60

General Electric Co., Cincinnati, Ohio.
EVALUATION OF IRON-CHROMIUM-YTTRIUM ALLOYS FOR SERVICE TO 2300°F, by J. F. Collins, N. McConnaughey and F. E. Walker. Preliminary rept. on Contract AT(11-1)-171. 6 June 61, 18p.

TID-16378 $6.60

Illinois U., Urbana.
INTERPRETATION OF ANNEALING SPECTRA OF THE NOBLE METALS, by John William DeFord. Technical rept. no. 29 on Contract AT(11-1)-182. June 62, 65p. 25 refs.

TID-16373 $4.60

Illinois U., Urbana.
LOW TEMPERATURE ANNEALING SPECTRUM OF ELECTRON IRRADIATED GOLD AND CADMIUM, by Walter Bauer. Technical rept. no. 28 on Contract AT(11-1)-182. June 62, 50p. 14 refs.

TID-16369 $4.60

Materials Science Center, Cornell U., Ithaca, N. Y.
INTERPRETATION OF RECENT EXPERIMENTS ON DIFFUSION IN METALS DURING PLASTIC DEFORMATION. PART III, by A. L. Ruoff and R. W. Balluffi. 6 Aug 62, 44p. 33 refs. MSC-48.

TID-16367 $8.10

Materials Science Center, Cornell U., Ithaca, N. Y.
POINT DEFECT MODELS FOR STRAIN-ENHANCED DIFFUSION IN METALS. PART I, by R. W. Balluffi and A. L. Ruoff. 6 Aug 62, 83p. 56 refs. MSC-46.

TID-16221 $1.60

Minnesota U., Minneapolis.
SELF DIFFUSION IN LIQUID TIN, by C. H. Ma and R. A. Swalin. Rept. on Contract AT(11-1)-841. [1961] 15p.

PB 162 016 $2.60

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
FABRICATION AND CHEMICAL REACTIVITY OF MOLYBDENUM, by Murray A. Schwartz. Special rept. May 49, declassified 11 June 61. 24p. 22 refs. Rept. no. NEPA-1050-EMR-59.

DESCRIPTORS: *Molybdenum, Sintering, Chemical reactions, *Graphite, *Uranium compounds, Metallic compounds, *Carbides, Refractory materials, Heat resistant alloys, *Powder metallurgy, Berylluim, Chromium, Nicobium, Iron, Nickel, Tantalum, Thorium, Tungsten, Magnesium, Titanium, Vanodium, Zirconium, Cobalt.

This report consists of a compilation and correlation of data from the available literature on both the fabrication of molybdenum compacts by pressing and

GEAP-3743 $4.60

General Electric Co., San Jose, Calif.
RADIATION EFFECTS IN BORIDES. PART I. HELIUM RELEASE AND SWELLING IN IRRADIATED BORIDES, by E. W. Hoyt and D. L. Zimmerman. Rept. on Contract AT(04-3)-189. 13 Feb 62, 47p. 15 refs.

HW-SA-2458 $3.60

Hanford Atomic Products Operation, Richland, Wash.
CURRENT STATUS OF SOLVENT EXTRACTION PROCESSING OF IRRADIATED URANIUM FUELS, by M. K. Harmon. 22 Feb 62, 34p. 23 refs.

HW-69471 $11.00

Hanford Atomic Products Operation, Richland, Wash.
AN INVESTIGATION OF THE OPERATIONAL CHARACTERISTICS OF THE PERLOW SPECTROMETER, by J. S. Loomis, Jr. Rept. on Contract AT(45-1)-1350. 2 May 61, 149p. 59 refs.

HW-71953 $3.60

Hanford Atomic Products Operation, Richland, Wash.
SPECTRUM V: INFINITE MEDIUM THERMAL FLUX SPECTRUM PROGRAM, by J. E. Schlosser. Rept. on Contract AT(45-1)-1350. 5 Dec 61, 34p. 5 refs.

HW-74194 $1.10

Hanford Atomic Products Operation, Richland, Wash.
THE USE OF CELLOSOLVE IN NaK DISPOSAL, by C. G. McCormack. Rept. on Contract AT(45-1)-1350. 4p.

TID-16156 $1.10

Laboratories for Applied Sciences, U. of Chicago, Ill.
THE APPLICATIONS OF ISOTOPES TO INDUSTRIAL PROBLEMS. Progress rept. no. 39, 15 May-15 June 62, on Contract AT(1101)-712. 22 June 62, 5p. 2 refs.

TID-16338 $4.60

Laboratories for Applied Sciences, U. of Chicago, Ill.
RADIOISOTOPES RESEARCH, DEVELOPMENT, AND RELATED ACTIVITIES. Quarterly progress rept. 15 Mar-15 June 62, on Contract AT(11-1)-712. July 62, 41p. 6 refs. LAS-SR-161-47.

NYO-2669 $9.10

Laboratory for Nuclear Science, Mass. Inst. of Tech., Cambridge.
PROGRESS REPORT. NO. 60. Rept. on Contracts AT(30-1)-2098 and AT(30-1)-905. 1 May 62, 108p. 54 refs.

TID-15331 $1.60

Massachusetts Inst. of Tech., Cambridge.
NUCLEAR ENERGY LEVELS IN P^{29}, by M. W. Brenner, A. M. Hoogenboom, and E. Kashy. 11 Apr 62, 11p. 12 refs.

TID-16139 $16.50

Massachusetts Inst. of Tech., Cambridge.
THE SOLVENT EXTRACTION OF NITROSYLRUTHENIUM BY TRILAURYLAMINE IN NITRATE SYSTEM, by Richard E. Skavdahl and Edward A. Mason. Summary rept. 1 July 60-31 Mar 62, on Contract W-7405-ENG-26. 1 June 62, 237p. 28 refs. MITNE-20.

TID-16397 $3.60

Radiation Applications, Inc., Long Island City, N. Y.
FOAM SEPARATION. Quarterly progress rept. on. 2, 1 Oct-31 Dec 60, on Subcontract 2024. 25 Jan 61, 40p. 5 refs.

TID-16398 $2.60

Radiation Applications, Inc., Long Island City, N. Y.
FOAM SEPARATION, by J. J. Weinstock and E. Rubin. Quarterly progress rept. no. 3, 1 Jan-31 Mar 61, on Subcontract 2024. 26 Apr 61, 22p. 2 refs.

RAI-307 $2.60

Radiation Applications, Inc., Long Island City, N. Y.
A STUDY OF THE MECHANISM OF RADIATION-INDUCED GELATION IN MONOMER-POLYMER MIXTURES, by George Odian, Bruce S. Bernstein and others. Quarterly summary rept. 1 May-31 July 62, on Contract AT(30-1)-2816. 1 Aug 62, 29p. 2 refs.

RRL-84 $1.60

Radiation Research Labs., Mellon Inst., Pittsburgh, Pa.
QUARTERLY REPORT, 1 Apr-30 June 62, on Contract AT(30-1)-2310. 10 July 62, 15p. 6 refs.

fluoride-phosphate coatings and properly designed punches. The optimum punch tip was a segment of a circle with a half-angle of 70 degrees for backward extrusion at 340,000 psi as compared with 400,000 psi for a flat punch. Extrudability potentials were determined at 80, 500, and 1000 F for Ti-13V-11Cr-3Al, Ti-3Al-2.5V, Ti-6Al-4V, Ti-16V-2.5Al, and Ti-8Al-1Mo-1V alloys. Forward-extrusion pressures from 124,000 to 252,000 psi were required to cold extrude the all beta Ti-13V-11Cr-3Al alloy into solid round bars. (See also PB 155 150)

PB 162 050 $10.10

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
REPORT ON BERYLLIUM, by Walter Baxter. [Rept. on Contract W33-08-ac-14801]. 20 Aug 48, declassified 11 Sep 61. 123p. 73 refs. Rept. no. NEPA 721-EMR-32.

DESCRIPTORS: *Beryllium, *Beryllium alloys, Physical properties, Chemical equilibrium, Microanalysis, Microstructure, Radiation effects, Manufacturing methods, *Powder metallurgy, Molecular weight, *Nuclear power plants, *Reactor modulators, X-rays, Permeability, Ultrasonics.

Structural Metallurgy and Corrosion

BMI-1563 $3.60

Battelle Memorial Inst., Columbus, Ohio.
CORROSION OF THORIUM AND URANIUM DURING LONG-TERM STORAGE, by Elmer F. Stephan, Paul D. Miller and Frederick W. Fink. Rept. on Contract W-7405-eng-92. 24 Jan 62, declassified 17 May 62. 32p. 2 refs.

PB 162 057 $9.10

Martin [Marietta Corp.] Baltimore, Md.
MARTIN-ANPP CORROSION TESTING PROGRAM METHODS AND PROCEDURES, by Joseph F. O'Brien. Rept. on Contract DA 44-009-eng-3581. Feb 61, 103p. Rept. no. MND-E-2145; AD-252 666.

DESCRIPTORS: *Corrosion research, Water, Test methods, Test equipment, Sterilizers, *Heat exchangers, Handbooks, Sampling, Oxygen, Metals, Test facilities, Corrosion, Nuclear power plants.

Methods and procedures utilized in the ANPP Corrosion Test Program are outlined. Those methods which are common to all tests within the program or which are unique are described in detail. Physical descriptions and startup and operating procedures for the rocking autoclaves and for primary and secondary systems of the corrosion loop are given in detail. Physical descriptions and fabrication techniques for test specimens, including various types of autoclave specimens and model and miniature heat exchangers, are covered. Pre-test and post-test evaluation techniques are described. Sampling procedures and chemical analysis techniques are outlined. A method for determining the temporal behavior of the heat transfer characteristics of the vessels is covered. A complete flow and instrumentation diagram of the corrosion loop as well as electrical schematic diagrams are included. (Author)

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

BMI-X-199 $2.60

Battelle Memorial Inst., Columbus, Ohio.
RADIOISOTOPE AND RADIATION APPLICATIONS, ed. by Duane N. Sunderman. Quarterly progress rept. on Contract W-7405-eng-92. 18 Apr 62, 25p. 2 refs.

BMI-X-10009 $3.60

Battelle Memorial Inst., Columbus, Ohio.
RADIOSOTOPE AND RADIATION APPLICATIONS, ed. by Duane N. Sunderman. Quarterly progress rept. on Contract W-7405-eng-92. 19 July 62, 34p. 15 refs.

TID-16074 $2.60

Brown U., Providence, R. I.
EXPERIMENTAL AND THEORETICAL HIGH ENERGY PHYSICS, by David Feldman and Anatole M. Shapiro. Progress rept. on Contract AT(30-1)-2262. 1 June 62, 24p. 17 refs.

TID-16027 $1.60

Buffalo U., N. Y.
CARBONATE COMPLEXES OF THE LIGHTER LANTHANIDES, by Howard S. Sherry (Master's thesis) and Jacob A. Marinsky. Rept. on Contract AT(30-1)-2269. 13 June 62, 17p. 12 refs.

TID-16024 $8.60

Buffalo U., N. Y.
STUDIES IN SOLUTION AND NUCLEAR CHEMISTRY, by Jacob A. Marinsky. Progress rept. 1 Oct 61-30 Sep 62, on Contract AT(30-1)-2269. 1 July 62, 100p. 74 refs.

TID-15820 $6.60

Carnegie Inst. of Tech., Pittsburgh, Pa.
NUCLEAR CHEMISTRY RESEARCH OF HIGH ENERGY NUCLEAR REACTIONS AT CARNEGIE INSTITUTE OF TECHNOLOGY, 1961-1962, by Albert A. Caretto, Jr. Progress rept. 1961-1962, on Contract AT(30-1)-2897. 1 June 62, 68p. 20 refs.

PB 162 037 $2.60

General Electric Co., Syracuse, N. Y.
RADIACMETER - ELECTRET TYPES, by H. B. Marvin. Final engineering rept. on Contract NObsr-49200. 1 Dec 53, 27p. 7 refs. AD-35 301.

DESCRIPTORS: *Electrets, *Dosimeters, Design, Sensitivity, Ethylenes, Fluorides.

A development was undertaken to design and produce a small quantity of electrets to meet field service conditions for use as personal dosimeters for measuring the time integral of intensity of ionizing radiations. Samples were built and tests made under simulated service conditions. Accuracy of 10% was needed under wide ranges of service conditions and of the radiation characteristics. After a survey at midpoint of the contract, it was decided to terminate the development. Operative samples of the radiacmeters were delivered. (Author)

TID-16329 $1.10

Michigan U. Coll. of Literature, Science, and The Arts, Ann Arbor.
THE UNIVERSITY OF MICHIGAN 83-INCH CYCLOTRON, by W. C. Parkinson and R. S. Tickle. Progress rept. on Contract AT(11-1)-921. July 62, 6p. 03763-8-P.

TID-15835 $1.10

Rensselaer Polytechnic Inst., Troy, N. Y.
LINEAR ACCELERATOR PROJECT. Progress rept. Jan-Mar 62, on Contract AT(30-3)-328. 16 Apr 62, 8p.

TID-16309 $3.60

Rensselaer Polytechnic Inst., Troy, N. Y.
LINEAR ACCELERATOR PROJECT. Annual technical rept. for FY 1962, on Contract AT(30-3)-328. 30 July 62, 33p. 9 refs.

TID-15746 $3.60

Vanderbilt U., Nashville, Tenn.
CONSTRUCTION AND CALIBRATION OF NEUTRON LONG COUNTER, by Robert W. Wood. Master's thesis. June 55, 33p. 12 refs.

WCAP-1989 $2.60

Westinghouse Electric Corp., Pittsburgh, Pa.
MINIATURE NEUTRON DETECTOR DEVELOPMENT, ed. by J. Weisman. Quarterly progress rept. for period ending 31 Mar 62, on Contract AT(30-1)-2827. Apr 62, 26p. 2 refs.

NYO-9809 $3.60

Westinghouse Research Labs., Pittsburgh, Pa.
ULTRAHIGH VACUUM TECHNIQUES, by R. E. Fox, W. J. Lange and J. H. Singleton. Annual rept. 1 Jan-31 Dec 61, on Contract AT(30-1)-2823. 21 Mar 62, 39p. Research rept. 62-808-441-R2.

NYO-9810 $1.10

Westinghouse Research Labs., Pittsburgh, Pa.
ULTRAHIGH VACUUM TECHNIQUES. Quarterly progress rept. 1 Jan-31 Mar 62, on Contract AT(30-1)-2823. 2 May 62, 10p. Research rept. 62-808-441-R3.

Nuclear Engineering and Power

APAE-Memo-305 (Suppl. 1) $4.60

Alco Products, Inc., Schenectady, N. Y.
MEASUREMENTS AND CHANGES ON SM-1 CORE II DURING PERIOD OCTOBER 1, 1961 TO MAY 30, 1962, by F. G. Moote, W. C. Best and J. D. Kortheuer. Rept. on Contract AT(30-1)-2639. 3 July 62, 43p. 11 refs.

NYO-10132 $1.60

Rochester U., N. Y.
7070 PROGRAM FOR A MONTE-CARLO CALCULATION OF A NUCLEAR CASCADE, by Suresh Thakore, A. C. Melissinos and J. Tinlot. 25 June 62, 15p.

SRIA-62 $1.60

Stanford Research Inst., Menlo Park, Calif.
RADIATION STABILITY OF ORGANIC LIQUIDS, by A. H. Samuel and W. E. Wilson. Semi-annual rept. no. 3, 21 Dec 61-30 June 62, on Contract AT(04-3)-115. 30 June 62, 12p. 6 refs. SRI Proj. PHU-3501.

TID-15743 $6.60

Vanderbilt U., Nashville, Tenn.
A RANGER STUDY OF THE Po-Be NEUTRON SPECTRUM, by Herbert Gursky. Master's thesis. 23 May 53, 65p. 19 refs.

WERL-0100 $6.60

Westinghouse Research Labs., Pittsburgh, Pa.
FORMATION OF CHEMICALLY FREE HALOGEN BY RADIOLYSIS OF SOLID POTASSIUM CHLORIDE, by L. M. Epstein. Rept. on Contract AT(30-1)-2829. June 62, 66p. 13 refs.

Elementary Particles

TID-15834 $5.60

Catholic U. of America, Washington, D. C.
A STUDY OF THE CHERENKOV YIELD AT HIGH ENERGIES by William Joseph Larkin. Doctoral thesis. 28 May 62, 53p. 27 refs.

NASA N62-14353 $5.60

Center for Radiophysics and Space Research, Cornell U., Ithaca, N. Y.
MAGNETIC EFFECTS OF GEOMAGNETICALLY TRAPPED PARTICLES, by Martin Lester Dwarkin. Rept. on Grant NsG-184-60 and Contract AF 49(638)915. May 62, 53p. 22 refs. CRSR-117; AFOSR-3003.

NASA N62-10561 $1.10

Space Physics Research Lab., U. of Michigan, Ann Arbor.
CHARGED PARTICLE MEASUREMENTS ABOVE 100 KM BY THE LANGMUIR PROBE TECHNIQUE, by L. H. Brace. Quarterly status rept. no. JQ-7, 1 July-30 Sep 61, on Contract NASw-139. Oct 61, 4p. 2 refs. Rept. 03599-7-P.

Instruments and Installations

Order from GPO $4.00 as
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Brookhaven National Lab. [Upton, N. Y.]
PROCEEDINGS, INTERNATIONAL CONFERENCE ON HIGH ENERGY ACCELERATORS, SEPTEMBER 6-12, 1961, SPONSORED BY THE INTERNATIONAL UNION FOR PURE AND APPLIED PHYSICS, THE U. S. ATOMIC ENERGY COMMISSION, ASSOCIATED UNIVERSITIES, INC., ed by M. Hildred Blewett. 1961, 499p. 307 refs.

DESCRIPTORS: *Conferences, *Particle accelerators, Linear accelerators, Accelerators, Synchrotrons, Cryogenics, Superconductivity, Cyclotrons, Ion sources, Particle beams, Particles.

Contents:
The role of high energy accelerators in particle physics
Particle production by high-energy accelerators
  Reports on operating characteristics of new accelerators
New developments in major accelerators presently in the design stage
  High energy linear accelerators
Studies of possible energy and intensity extensions
  Fundamental and practical limitations of particle accelerators
Theory
Storage rings
Cryogenic and superconducting techniques
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Post-deadline papers
  Ion sources and injection
  Shielding for high-energy accelerators
Production and formation of particle beams for high-energy physics experimentation

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Bureau of Mines, Pittsburgh, Pa.
RESEARCH ON THE HAZARDS ASSOCIATED WITH THE USE OF LIQUID HYDROGEN IN BUBBLE CHAMBERS, by Michael G. Zabetakis, Aldo L. Furno and Henry E. Perlee. Final rept. no. 3861. 28 May 62, 58p. 24 refs.

NAA-SR-MEMO-6928 $3.60

Atomics International, Canoga Park, Calif.
CRITICAL HEAT FLUX IN POOL BOILING: EFFECT OF GEOMETRY AND HEATER CHARACTERISTICS, by G. C. Pinchera. 21 Dec 61, 33p. 70 refs.

NAA-SR-MEMO-6891 $2.60

Atomics International, Canoga Park, California.
EFFECTS OF DISSOLVED NITROGEN ON SUBCOOLED NUCLEATE BOILING IN SANTOWAX R, by P. R. Benson. 20 Dec 61, 22p. 9 refs.

NAA-SR-MEMO-7134 $5.60

Atomics International, Canoga Park, Calif.
MEASUREMENTS TO DETERMINE THERMAL UTILIZATION IN THE HALLAM EXPONENTIAL LATTICES CONTAINING UC FUEL ELEMENTS, by O. R. Hillig. 15 Mar 62, 54p. 7 refs.

PB 162 014 $6.60

Battelle Memorial Inst., Columbus, Ohio.
PROTECTIVE COATINGS FOR BERYLLIUM CARBIDE-BEARING FUEL-ELEMENT BODIES, by H. E. Wagner, H. F. Reid and others. Topical rept. 12 June 50, declassified 11 Sep 61. 69p. 1 ref. Rept. no. BMI-N-44; NEPA-1517.

DESCRIPTORS: *Fuel elements, *Beryllium compounds, *Carbides, Thermal expansion, *Coatings, Preparation, Metal coatings, Ceramic coatings, Refractory coatings.

The protective qualities of experimental coatings for bodies composed chiefly of beryllium carbide were established as being closely related to the porosity of the underbody. Five types of coatings were developed which protected bodies having apparent porosities of less than 25 per cent. No promising coatings were obtained, however, for underbodies of higher porosity. Coatings which protected the more dense compacts of beryllium carbide, particularly those containing additions of zero to five per cent of uranium carbide, against oxidation at 2500°F are listed.

WAPD-PWR-TE-140 $7.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
EVALUATION OF CORE THERMAL AND HYDRAULIC DATA. PWR CORE 1 SEED 3, START-UP TO MID-LIFE, by M. G. Friedman and L. M. Swartz. Rept. Oct 61-Mar 62, on Contract AT(11-1)-GEN-14. May 62, 91p. DLCS-36201, DLCS-24301, and DLCS-35801.

WAPD-T-1502 $3.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
MEASUREMENT OF SOME BASIC PARAMETERS IN TWO PHASE ANNULAR FLOW, by E. R. Quandt. Rept. on Contract AT(11-1)-GEN-14. May 62, 39p. 21 refs.

WAPD-PWR-TE-86 $2.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
RADIATION LEVELS OF THE PRIMARY SYSTEM OF PWR, by W. Lechnick. Rept. on Contract AT(11-1)-GEN-14. Mar 62, 22p. 10 refs. DLCS-36501.

WAPD-T-1463 $1.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
SYNTHESIS APPROXIMATIONS IN THE TIME DIRECTIONS, by J. A. Bewick, A. F. Henry, and S. Kaplan. Rept. on Contract AT(11-1)-GEN-14. Apr 62, 19p. 10 refs.

ORO-546 $1.10

Brush Beryllium Co., Cleveland, Ohio.
HELICAL FINNED TUBE DEVELOPMENT, by E. A. Murphy and J. G. Klein. Rept. 19 Feb-17 Mar 62, on Contract AT(40-1)-2912. 10p.

PB 160 939 $1.60

Bureau of Yards and Docks, Washington, D. C.
HARDENING - OPTIMUM BLAST PROTECTION FOR MINIMUM COST, by W. J. Christensen. May 62, 11p. 4 refs. Technical study #29.

DESCRIPTORS: *Nuclear explosions, *Survival, *Structures, Hardening, Pressure, *Shelters, Design, *Air blast, Countermeasures.

The purpose of this paper is to present a method of assisting in the choice of a design overpressure which would give the maximum survival probability per unit cost. The method as presented in this paper is applicable to various types of relatively shallow buried cut-and-cover structures subjected to potential air blast damage by direct attack with nuclear weapons. For the curves presented later, it is assumed that the facility is the aiming point. The method is admittedly crude but will provide an additional means of reviewing proposed protective construction. The major limitation of the method is lack of specific well defined cost factors over the wide range of overpressures considered. It is expected that minor modifications of the method will apply to other protected facilities of any nature regardless of whether they are considered prime targets or near prime targets. (Author)

APAE-Memo-279 $3.60

Alco Products, Inc., Schenectady, N. Y.
NUCLEAR ANALYSIS OF VARIOUS SPERT-III CRITICAL EXPERIMENTS, by S. Paluszkiewicz. Rept. on Contract AT(30-3)-326. 27 Apr 61, 40p. 14 refs.

APAE-Memo-315 $9.10

Alco Products, Inc., Schenectady, N. Y.
PRIMARY SHIELD OPTIMIZATION SURVEY FOR THE PL-3 REACTOR, by J. F. Scoles and A. N. Crouch. Rept. on Contract AT(30-1)-2900. 28 June 62, 86p. 10 refs.

APAE-Memo-316 $6.60

Alco Products, Inc., Schenectady, N. Y.
SELECTION OF CORE DESIGN NO. 1 FOR TYPE 5 REPLACEMENT CORES FOR SM-1 AND SM-1A, by S. L. Davidson and S. Paluszkiewicz. Rept. on Contract AT(30-1)-2639. 3 July 62, 65p. 26 refs.

APAE-105 (Suppl. 1) $2.60

Alco Products, Inc., Schenectady, N. Y.
THERMAL ANALYSIS OF SM-1 CORE III, by S. L. Davidson. Rept. on Contract AT(30-1)-2639. 29 June 62, 23p. 11 refs.

APAE-Memo-317 $8.60

Alco Products, Inc., Schenectady, N. Y.
THERMAL STRESS TESTING OF TYPE 1 FUEL PLATES, by F.G. Gebhardt. Rept. on Contract AT(30-1)-2639. 27 June 62, 95p. 3 refs.

TID-6702 $13.50

Allis-Chalmers Mfg., Co., Milwaukee, Wis.
FUEL ASSEMBLY HANDLING EXPERIMENT FOR THE EXPERIMENTAL GAS COOLED REACTOR, by P. J. Lain and P. V. Goulden. Rept. on Contract AT(01-1)-925. [1961] 199p. Rept. no. RD-0100.

ACNP-62006 $12.00

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
PATHFINDER ATOMIC POWER PLANT. STEAM SEPARATOR DEVELOPMENT, by G. C. Kutsch, D. H. Swanson, and H. W. Yant. Rept. on Contract AT(11-1)-589. 15 June 62, 181p. 13 refs.

ARF-1193-12 $5.60

Armour Research Foundation, Chicago, Ill.
SCINTILLATION SPECTROMETER MEASUREMENTS OF CAPTURE GAMMA RAYS FROM NATURAL ELEMENTS, by Reginald C. Greenwood and John H. Reed. Quarterly rept. on Contract AT(11-1)-578. 20 July 62, 53p. 23 refs.

ARF-4267-1 $2.60

Armour Research Foundation, Chicago, Ill.
STUDIES OF REACTOR CONTAINMENT. Bi-monthly progress rept. May-June 62, on Contract AT(11-1)-578. 26p.

ARF-8262-1 $4.60

Armour Research Foundation, Chicago, Ill.
STUDIES OF REACTOR CONTAINMENT STRUCTURES, by N. A. Weil, R. L. Chiapetta and others. Bi-monthly progress rept. May-June 62, on Contract AT(11-1)-578. 16 July 62, 42p. 3 refs.

NAA-SR-MEMO-6782 $2.60

Atomics International, Canoga Park, Calif.
COMPARISON OF PRESSURE DROP PRODUCED BY SPIRAL WRAPS, COOKIE CUTTERS AND OTHER ROD BUNDLE SPACERS, by R. C. Noyes. 17 Oct 61, 27p. 7 refs.

ORO-577 $11.00

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
MATERIALS FOR HIGH TEMPERATURE NUCLEAR ENGINEERING APPLICATIONS, by J. D. Fleming and J. W. Johnson. Progress rept. no. 3, 15 Aug 60-15 Aug 61, on Contract AT(40-1)-2483. 151p.

ORO-578 $8.10

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
MATERIALS FOR HIGH TEMPERATURE NUCLEAR ENGINEERING APPLICATIONS, by J. D. Fleming, J. W. Johnson and others. Quarterly rept. no. 1, 15 Aug 61-1 Apr 62, on Contract AT(40-1)-2483. 84p. 15 refs.

HW-73600 (Rev) $1.60

Hanford Atomic Products Operation, Richland, Wash.
ATR GAS LOOP FOR STRUCTURAL MATERIALS IRRADIATION, by D. C. Kaulitz. Rept. on Contract AT(45-1)-1350. 5 July 62, 16p.

HW-65444 $1.10

Hanford Atomic Products Operation, Richland, Wash.
A DUAL SCANNING SYSTEM FOR REACTOR FUEL FAILURE DETECTION, by R. S. Paul. Invention rept. on Contract AT(45-1)-1350. 1 June 60, 9p.

HW-SA-2547 $1.60

Hanford Atomic Products Operation, Richland, Wash.
ENVIRONMENTAL TESTING OF REACTOR STRUCTURAL MATERIALS, by A. L. Bement and J. J. Laidler. 20 Apr 62, 17p.

HW-71083 $2.60

Hanford Atomic Products Operation, Richland, Wash.
FIELD LEAK TESTING OF HAPO REACTOR CONFINEMENT FILTER INSTALLATIONS, by E. L. Etheridge. 19 Sep 61, 20p.

HW-72048 $4.60

Hanford Atomic Products Operation, Richland, Wash.
FISSION PRODUCT POISONING IN A MODEL PLUTONIUM RECYCLE SYSTEM WITH CLOSE COUPLED FUEL REPROCESSING, by G. Jansen, Jr. Rept. on Contract AT(45-1)-1350. 2 Jan 62, 48p.

HW-73395 $1.60

Hanford Atomic Products Operation, Richland, Wash.
PRELIMINARY BOILING BURNOUT EXPERIMENTS WITH A 19-ROD BUNDLE GEOMETRY IN AXIAL FLOW, by G. M. Hesson, D. E. Fitzsimmons and others. Rept. on Contract AT(45-1)-1350. 17 Apr 62, 14p. 5 refs.

HW-73030 $9.60

Hanford Atomic Products Operation, Richland, Wash.
PRTR AUTOMATIC CONTROLLER - REVIEW OF DESIGN ANALYSIS AND PRE-OPERATIONAL TESTING WORK AND REPORT BIBLIOGRAPHY, by H. K. Nelson. Rept. on Contract AT(45-1)-1350. 20 Mar 62, 122p. 17 refs.

HW-73292 $1.60

Hanford Atomic Products Operation, Richland, Wash.
PRTR COOLING FOLLOWING LOSS OF FORCED CIRCULATION OF PRIMARY COOLANT, by J. K. Anderson. Rept. on Contract AT(45-1)-1350. 6 Apr 62, 12p. 4 refs.

HW-70880 $4.60

Hanford Atomic Products Operation, Richland, Wash.
PRTR: FUEL ELEMENT EXAMINATION FACILITY OPERATIONS MANUAL, by W. S. Kelly and R. L. Straley. Rept. on Contract AT(45-1)-1350. [1956] 45p. 81 refs.

HW-72097 $2.60

Hanford Atomic Products Operation, Richland, Wash.
RESULTS OF HEAT TRANSFER EXPERIMENTS FOR COOLING OF PRTR FUEL ELEMENTS BY TRANSVERSE AIR FLOW, by E. D. Waters, T. W. Ambrose, and M. E. Shockley. Rept. on Contract AT(45-1)-1350. 28 Dec 61, 25p. 3 refs.

HW-67246 $2.60

Hanford Atomic Products Operation, Richland, Wash.
TWO DIMENSIONAL FLUX AND POWER CALCULATIONS FOR THE PRTR, by R. E. Peterson and W. H. Wolf. Rept. on Contract AT(45-1)-1350. 31 Oct 60, 22p. 6 refs.

HW-72616 $2.60

Hanford Atomic Products Operation, Richland, Wash.
TRIP: A REACTOR KINETICS CODE WITH PARAMETER SEARCH, by D. D. Matsumoto and W. L. Stiede. Rept. on Contract AT(45-1)-1350. 27 June 62, 27p. 3 refs.

TID-16289 $1.10

Catholic U. of America, Washington, D. C.
SIMULATED NUCLEAR REACTOR VIBRATIONAL HEAT TRANSFER. Semi-annual progress rept. 1 Nov 61-30 Apr 62, on Contract AT(30-1)-2655. 6p.

TID-16381 $12.00

Combustion Engineering, Inc., Chattanooga, Tenn.
750 eMW ADVANCED GAS COOLED REACTOR POWER PLANT STEAM GENERATOR STUDY, by L. D. Fraley. Rept. on Contracts 2167 and 2662Y. June 62, 163p. 24 refs. CE-1077.

GNEC-241 $9.60

Combustion Engineering, Inc., Windsor, Conn.
NUCLEAR SUPERHEAT DEVELOPMENT PROGRAM. Quarterly progress rept. no. 12, Apr-June 62, on Contract AT(11-1)-795. 116p. 19 refs. Prepared in cooperation with General Nuclear Engineering Corp., Dunedin, Fla.

DLCS 5000662 $3.60

Duquesne Light Company, Shippingport, Pa.
MONTHLY OPERATING REPORT, June 62. Rept on Contract AT(11-1)-292. 23 July 62, 36p.

PB 162 027 $1.60

Fribourg U. (Switzerland).
LIQUIDS FOR USE IN LARGE BUBBLE CHAMBERS, by B. Hahn, G. Riepe, and A. W. Knudsen. Rept. on Contract AF 61(514)1262. 1959, 11p. AFOSR-TN-59-561; AD-253 122.

DESCRIPTORS: *Radioactive decay, Liquids, Particles, Carbon compounds, Sulfur compounds, Radiation instruments, Tellurium compounds, Bromine compounds, Chlorine compounds, Fluorides, Bubble chambers.

The pure liquids C3F8, C4F10, SF6, C2C1F5, CBrF3 and TeF6, as well as binary mixtures of these substances, were found to have very desirable properties for use in large bubble chambers for studying decay modes of elementary particles.

GA-2241 $1.10

General Atomic Div., General Dynamics Corp., San Diego, Calif.
APPARATUS AND PROCEDURE FOR COATING THORIUM URANIUM CARBIDES WITH CARBON AT 1000°C TO 1400°C, by C. S. Luby. Rept. on Contract AT(04-3)-314. 25 May 61, 6p.

GAMD-2797(Vol. I) $11.50

General Atomic Div., General Dynamics Corp., San Diego, Calif.
DDB: A TWO DIMENSIONAL REACTOR DIFFUSION CODE WITH CRITICALITY SEARCH AND BURNOUT OPTIONS. VOLUME I, by J. H. Alexander, C. Cyl-Champlin, and others. Rept. on Contract AT(04-3)-314. 15 Mar 62, 148p.

GAMD-3168 $8.10

General Atomic Div., General Dynamics Corp., San Diego, Calif.
TNT: A PROGRAM FOR ANALYZING THE TRANSIENT PERFORMANCE OF THE PEACH BOTTOM HTGR FISSION PRODUCT TRAPPING SYSTEM, by W. W. Graham III. Rept. on Contract AT(04-3)-314. 15 May 62, 81p.

PB 160 942 $2.60

[General Dynamics] Fort Worth, Tex.
THE NEUTRON FLUX SPECTRUM OF THE GROUND TEST REACTOR, by J. Romanko. 7 May 57, 21p. 4 refs. FZM-914.

DESCRIPTORS: *Test reactors, *Neutron flux density, Fast neutrons, Reactor cores, Radiation counters, Resonance, *Thermal reactors.

The differential neutron flux spectrum of the Ground Test Reactor (GTR), a water-moderated thermal reactor, has been determined at a position three and one-half inches from the north face of the core. Flux measurements were made for three neutron energy regions: thermal, 1-10 kev, and 2.5 to 8 Mev, from data obtained with BF_3 counters, resonance detectors, and threshold detectors, respectively. A theoretical flux spectrum was obtained for the fast neutrons from the model consisting of a simple proton-moderated reactor fissioning U-235. This spectrum was fitted through the threshold and resonance detector measurements by normalizing at 3 Mev. The accuracy of the spectrum is well within the limits of experimental error. On extrapolating the dE/E component towards lower energies, the theoretical spectrum is consistent with experimental thermal neutron flux data. The correlation of experimental and theoretical results indicates that a three-group specification, consisting of a thermal component, a dE/E contribution, and a fast neutron spectrum, is sufficient for the GTR. (Author)

GEAP-3884 $5.60

General Electric Co., San Jose, Calif.
HIGH POWER DENSITY DEVELOPMENT PROJECT, by L. K. Holland. Quarterly progress rept. no. 6, July-Sep 61, on Contract AT(04-3)-361. Oct 61, 59p.

DESCRIPTORS: *Uranium compounds, *Dioxides, Heat tolerance, Measurement, Temperature, Reactor fuels, Materials, Calorimetry.

The mean heat capacity of a sample of powdered UO_2, a possible fuel material for a nuclear reactor, was determined as a function of temperature from measurements of heat content. A thin-walled nickel capsule containing the material was heated in an electric furnace and dropped into a water calorimeter. The values calculated from the experimental data are nearly constant over the temperature range, room temperature to 250-1100°C (482-2012°F). The mean heat capacity is given by the equation $C_p = 0.070 \pm 0.005$ cal $gm^{-1}{}^{o}C^{-1}$ (0.070 ± 0.005 BTU $lb^{-1}{}^{o}F^{-1}$). (Author)

NMI-7249 $4.60

Nuclear Metals, Inc., Concord, Mass.
POWER REACTOR PROGRAM, by S. Isserow, R. W. Anderson and others. Progress rept. 1-31 Mar 62. 47p.

NMI-7250 $2.60

Nuclear Metals, Inc., Concord, Mass.
POWER REACTOR PROGRAM, by S. Isserow, R. W. Anderson, and W. J. Richmond. Progress rept. 1 Apr-30 Apr 62. 4 June 62, 28p.

NMI-7252 $1.60

Nuclear Metals, Inc., Concord, Mass.
POWER REACTOR PROGRAM, by S. Isserow, R. W. Anderson and others. Progress rept. 1-30 June 62. 25 July 62, 16p.

ORNL-TM-276 $5.60

Oak Ridge National Lab., Tenn.
ADMINISTRATION OF ORNL RESEARCH REACTORS, by W. R. Casto. Rept. on Contract W-7405-eng-26. 20 Aug 62, 54p. 12 refs.

ORNL-TM-274 $2.60

Oak Ridge National Lab., Tenn.
THE DETECTION OF BOILING IN A WATER-COOLED NUCLEAR REACTOR, by A. L. Colomb and F. T. Binford. Rept. on Contract W-7405-eng-26. 17 Aug 62, 20p. 7 refs.

ORNL-TM-266 $3.60

Oak Ridge National Lab., Tenn.
EXPERIMENT FACILITIES OF THE OAK RIDGE GRAPHITE REACTOR, by S. D. Sheppard. 17 Aug 62, 37p.

ORNL-TM-277 $3.60

Oak Ridge National Lab., Tenn.
FUEL CYCLES AND LOADING PROGRAMMING FOR WATER-COOLED RESEARCH REACTORS, by A. L. Colomb and D. Cavin. Rept. on Contract W-7405-eng-26. 31 July 62, 31p. 4 refs.

ORNL-TM-281 $4.60

Oak Ridge National Lab., Tenn.
GENERAL STANDARDS GUIDE FOR EXPERIMENTS IN ORNL RESEARCH REACTORS, by C. D. Cagle. Rept. on Contract W-7405-eng-26. 20 Aug 62, 48p. 11 refs.

ORNL-TM-291 $1.10

Oak Ridge National Lab., Tenn.
HOMOGENIZATION OF MOLTEN SALT REACTOR PROJECT FUEL SAMPLES, by M. J. Gaitanis, C. E. Lamb, and L. T. Corbin. 5 July 62, 7p.

ORNL-TM-288 $1.10

Oak Ridge National Lab., Tenn.
POWER REACTOR FUEL REPROCESSING PILOT PLANT: ACCOUNTABILITY MEASUREMENTS PROGRAM, by W. T. McDuffee. 18 July 62, 6p.

ORNL-3275 $1.60

Oak Ridge National Lab., Tenn.
RADIATION-INDUCED SINTERING OF THORIA POWDERS, by J. P. McBride and S. D. Clinton. Rept. on Contract W-7405-eng-26. 3 Aug 62, 18p. 7 refs.

PUC-1962-71 $9.10

Palmer Physical Lab., Princeton U., N. J.
β-γ CIRCULAR POLARIZATION MEASUREMENTS OF Sc^{46} AND Fe^{59}, by Ernest L. Haase. Thesis. Rept. on Contract AT(30-1)-937. May 62, 91p. 57 refs.

NASA N62-15111 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
FLUX DEPRESSION AND FISSION-FRAGMENT ESCAPE IN A GASEOUS CORE REACTOR, by D. F. Spencer. Rept. on Contract NAS7-100. 31 July 62, 27p. 4 refs. Technical rept. no. 32-278.

TID-15977 $6.60

Kansas State U., Manhattan.
NEUTRON FLUX AND ENERGY SPECTRUM MEASUREMENTS IN THE K.U. TRAINING REACTOR USING THRESHOLD FOILS, by Dennis R. Johnson. Master's thesis. May 62, 62p. 16 refs.

TID-15667 $12.00

Kansas State U. Engineering Experiment Station, Manhattan.
KSU PILE STANDARDIZATION AND STUDY OF SLOWING DOWN AND DIFFUSION MODELS, by Larry Ray Foulke. Master's thesis. Special rept. no. 8. May 61, 163p. 44 refs.

KAPL-M-PPA-40 $5.60

Knolls Atomic Power Lab., Schenectady, N.Y.
PASS, A DIGITAL COMPUTER PROGRAM FOR PLANT ANALYSIS, STEADY STATE, by Betty A. Brown and Keith W. Lallier. Rept. on Contract W-31-109-eng-52. 6 June 62, 54p.

KAPL-M-WAG-1 $2.60

Knolls Atomic Power Lab., Schenectady, N. Y.
PRESSURE DROP REVIEW FOR NGR APPLICATION, by William A. Golub. Status rept. 1 Dec 59, 24p.

IDO-11101 $4.60

Massachusetts Inst. of Tech., Cambridge.
ORGANIC MODERATOR-COOLANT IN-PILE IRRADIATION LOOP FOR THE MIT NUCLEAR REACTOR, by E. A. Mason, W. N. Bley, and D. T. Morgan. Progress rept. 1 July 61, on Contract AT(10-1)-1067. 1 July 61, 40p. 4 refs.

PB 162 013 $4.60

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
AXIAL CONTROL ROD IN CYLINDRICAL REACTORS, by Theodore Rubin, Henry E. Stern, and Fritz W. Mezger. 15 Nov 49, declassified 18 July 61, 51p. Rept. no. NEPA 1207-EAR-R14.

DESCRIPTORS: *Homogeneous reactors, *Reactor control, *Reactor cores, Reactor reactivity, Neutron flux density, Critical assemblies, Cylindrical bodies.

This report presents the effect of an axial absorber type control rod in terms of flux and power distribution and change in reactivity. The effect of the removal of a slug in terms of the change in reactivity induced is also investigated. In all cases the rod considered was 2" in diameter, and the reactor was assumed to be a homogeneous uranium and beryllium carbide mixture. Cylindrical reactors with a wide range of molecular ratios of beryllium carbide to uranium carbide were considered. Reactivity changes for complete insertion of the rod into the void varied from 1.2% to 8.9% for reactors with molecular ratios of 1:1 to 3000:1, while changes in reactivity induced by removal of a 2" axial slug, when the effect of streaming was included, varied from 4.3% to 1.1% for the same range of molecular ratios. (Author)

PB 162 011 $1.60

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
THE HEAT CAPACITY OF U_3O_8 POWDER AS A FUNCTION OF TEMPERATURE (400-1800°F), by H. Powers, F. Welch, and J. B. Trice. 26 Apr 49, declassified 11 June 61. 16p. 3 refs. Rept. no. NEPA-934-SCR-34.

DESCRIPTORS: *Uranium compounds, *Oxides, Powders, Heat tolerance, Measurement, Temperature, Reactor fuels, Materials, Calorimetry.

The mean heat capacity of a sample of powdered U_3O_8, a possible fuel material for a nuclear reactor, was determined as a function of temperature from measurements of heat content. A thin-walled nickel capsule containing the material was heated in an electric furnace and dropped into a water calorimeter. The mean heat capacity values calculated from the experimental data were nearly constant over the temperature range, room temperature to 250-975°C (482-1790°F). The average value was 0.074 ± 0.004 cal $gm^{-1}{}^{o}C^{-1}$ (0.074 ± 0.004 BTU $lb^{-1}{}^{o}F^{-1}$). From 975-1100°C (1790-2012°F) a small rise was observed. (Author)

PB 162 012 $1.10

Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
THE HEAT CAPACITY OF URANIUM DIOXIDE AS A FUNCTION OF TEMPERATURE (400-1800°F), by A. Cabbage, F. Welch, and J. B. Trice. 21 July 49, declassified 6 Nov 61. 11p. 3 refs. Rept. no. NEPA-935-SCR-35.

PB 162 024 $1.60

Naval Radiological Defense Lab., San Francisco, Calif.
SUGGESTED TECHNIQUES FOR TESTING THE EFFECTIVENESS OF RADIOLOGICAL RECLAMATION METHODS, by E. Shapiro, and E. T. Sheffield. 23 Nov 56, 20p. 3 refs. Research and Development Technical rept. USNRDL-TR-120; AD-127 542.

DESCRIPTORS: Effectiveness, *Decontamination, Mathematical prediction. *Radiological contamination.

After a contaminating nuclear attack, operational recovery of essential facilities will probably require the use of reclamation methods. Before carrying out large-scale reclamation operations, it is necessary to make effectiveness tests on small areas of the methods selected in the pre-attack recovery plan to see whether the methods will achieve the predicted effectiveness. For determining the effectiveness of reclamation methods, the following testing techniques are suggested: vertical measurement, horizontal measurement, computation, shielded instrument, and removable test area. The first three techniques appear to be most feasible operationally. If field experiments indicate reliability of these three techniques which require additional effort. In situations where a shielded instrument is available, maximum reliability would be achieved by using this instrument with the vertical or horizontal technique or, better, a combination of both. (Author)

Waste Disposal

DLCS 2180102 $2.60

Duquesne Light Co., Shippingport, Pa.
PERIODIC CHARACTERIZATION OF RADIOACTIVE WASTE DISPOSAL EFFLUENTS, CORE I SEED 3. 13 June 62, 25p.

DLCS-1690203 $1.60

Duquesne Light Co., Shippingport, Pa.
RADIOACTIVE WASTE DISPOSAL SYSTEM PERIODIC RADIATION MONITORING SURVEY CORE I, SEED 1. 10 Oct 60, 14p. T-612075.

TEI-809 $11.50

Geological Survey, Washington, D. C.
GEOLOGY OF THE WILLISTON BASIN, NORTH DAKOTA, MONTANA, AND SOUTH DAKOTA, WITH REFERENCE TO SUBSURFACE DISPOSAL OF RADIOACTIVE WASTES, by Charles A. Sandberg. June 62, 161p. 71 refs.

HW-71627 $1.60

Hanford Atomic Products Operation, Richland, Wash.
THE DECONTAMINATION OF CONDENSATE WASTES CONTAINING AMMONIA, by B. W. Mercer. Rept. on Contract AT(45-1)-1350. 12 Mar 62, 16p. 6 refs.

ORNL-TM-282 $5.60

Oak Ridge National Lab., Tenn.
THE DISPOSAL OF RADIOACTIVE LIQUID AND GASEOUS WASTE AT OAK RIDGE NATIONAL LABORATORY, by J. F. Manneschmidt and E. J. Witkowski. Rept. on Contract W-7405-eng-26. 17 Aug 62, 51p. 13 refs.

PHYSICS

PB 162 028 $2.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
NOTE ON A SIMPLIFIED TREATMENT OF THE FOCUSSING PHENOMENON AT SMALL APERTURES, by James C. Gilfert. Rept. on Study of Electromagnetic Radiation, Contract AF 33(616)7081. 15 Feb 61, 26p. Rept. no. 1083-5; AD-252 002.

DESCRIPTORS: *Optics, *Focusing, *Lenses, Optical equipment, Analysis.

The simplified treatment presented for predicting the effects of small apertures on focussed or plane waves was substantially justified by the observed data. Although the methods employed are admittedly approximate, it is encouraging to find that the simplest concepts of geometrical optics can be successfully applied down to apertures of a few wavelengths with only minor precautions. (Author)
(Physics--Optics, 20 Nov 62)

TID-16127 $2.60

[Physics, Engineering, Chemistry] Corp., Boulder, Colo.
THE SPECTRUM, THE EXCITATION AND IONIZATION CROSS-SECTIONS FOR PHOTO PROCESSES AND FOR COLLISIONS, OF FIVE TIMES IONIZED OXYGEN, by Carlos M. Varsavsky. Quarterly rept. no. 4, 1 Mar-31 May 62, on Contract AT(11-1)-1017. 27 June 62, 21p. 4 refs.

TID-15747 $3.60

Vanderbilt U., Nashville, Tenn.
THE VELOCITY OF ULTRASONIC WAVES IN A GROUP OF ALKYL BENZENE HOMOLOGS AND IN CHLORINE TRIFLUORIDE, by Raymond L. Tanner. Master's thesis. Mar 55, 35p. 27 refs.

OTO-60-1 $4.60

Public Health Service Off-Site Activities, Las Vegas, Nev.
KIWI-A-REACTORS, PRIME AND THREE. Final rept. on Contract AT(29-2)-162. 1960, 49p. Prepared in cooperation with Off-Site Radiological Safety Activities, Nevada Test Organization.

TID-16041 $2.60

Sandia Corp., Albuquerque, N. Mex.
MEASUREMENT OF BREMSSTRAHLUNG DOSE AND SPECTRUM FROM A 600 KVP PULSED X-RAY GENERATOR USING PHOTOGRAPHIC FILM, by G. H. Bouchard. June 62, 20p. 7 refs. SCDC-2688.

SRO-71 $1.60

Savannah River Operations Office, Ga.
HEAVY WATER POWER REACTOR PROGRAM. Monthly progress rept. July 62, 12p.

UNC-1003 $1.60

United Nuclear Corp., Hematite, Mo.
THE CHARACTERIZATION OF UO_2 POWDERS, by James F. Carpenter, Carl W. Kuhlman, and Robert A. Nelson. Quarterly rept. no. 6, 10 Jan-10 Apr 62, on Contract AT(40-1)-2699. 15p. 1 ref.

UNC-5023 $1.60

United Nuclear Corp., White Plains, N. Y.
HEAVY WATER-MODERATED POWER REACTOR PROGRAM. Quarterly progress rept. for period ending 30 June 62, on Contract AT(30-1)-2836. 30 June 62, 18p. 2 refs.

UNC-5019 $2.60

United Nuclear Corp., White Plains, N. Y.
PAWLING LATTICE TEST RIG. TEST REPORT NO. 3: TUBULAR FUEL ELEMENT LATTICES, by W. L. Brooks, G. G. Foster and R. D. Schamberger. Rept. on Contract AT(30-1)-2836. 20 June 62, 24p. 4 refs.

UNC-5020 $1.60

United Nuclear Corp., White Plains, N. Y.
PAWLING LATTICE TEST RIG: TEST REPORT NO. 4, LATTICE PITCH VARIATION, by W. L. Brooks, G. G. Foster and R. D. Schamberger. Rept. on Contract AT(30-1)-2836. 20 June 62, 16p. 6 refs.

UNC-5022 $2.60

United Nuclear Corp., White Plains, N. Y.
PAWLING LATTICE TEST RIG. TEST REPORT NO. 5, 19-ROD CLUSTER EXPERIMENTS, by W. L. Brooks, G. G. Foster, and R. D. Schamberger. Rept. on Contract AT(30-1)-2836. 30 June 62, 23p. 10 refs.

HW-SA-2548 $12.50

Washington U., Seattle.
DECONTAMINATION OF PRESSURIZED-WATER SYSTEMS, by Ronald D. Weed. Master's thesis. Rept. on Contract AT(45-1)-1350. 1962, 174p. 533 refs.

Radioactivity

TID-16108 $1.60

Columbia U., New York.
ON THE RADIATIVE CORRECTIONS TO $K \to e\nu$ AND $K \to u\nu$ DECAYS, by N. P. Chang. 25 June 62, 18p. 13 refs.

NYO-2303 $5.60

Laboratory for Nuclear Science, Mass. Inst. of Tech., Cambridge.
FRANTIC PROGRAM FOR ANALYSIS OF EXPONENTIAL GROWTH AND DECAY CURVES, by Paul C. Rodgers. Technical rept. no. 76 on Contract AT(30-1)-905. June 62, 51p. 3 refs.

PB 162 061 $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
STUDY OF AIRBORNE ACTIVITY RESULTING FROM DECONTAMINATION OF SHIPS CONTAMINATED WITH RADIOACTIVE FALL-OUT, by P. Farma. 22 May 56, 23p. 9 refs. Research and development technical rept. USNRDL-TR-94; AD-106 123.

DESCRIPTORS: *Ships, *Decontamination, Radioactive fall-out, Air, Contamination, *Radiological contamination, Dose rate, Radiation hazards, Safety.

The objectives of this study were (a) to determine whether airborne radioactivity caused by surface-removal decontamination of ships in shipyards would present an inhalation hazard to people working in decontamination zones, or working or living in areas near the zones; and (b) should such a hazard exist, to indicate some criterion for the minimum distance from a ship at which no precautionary measures would be required.

PB 162 044 $21.00

Microwave Lab., Northwestern U., Evanston, Ill.
INVESTIGATIONS OF MULTI-MODE PROPAGATION WAVEGUIDES AND MICROWAVE OPTICS, by R. E. Beam, M. M. Astrahan and others. Final rept. 1 May 49-30 Nov 50, on Contract W 36-039-sc-38240. [1950] 389p. 48 refs. ATI-94 929.

DESCRIPTORS: *Waveguides, Propagation, Wave transmission, Dielectrics, Ultrahigh frequency, *Microwaves, Microwave equipment, *Optics, Prisms (Optics), Antennas, Design, Antenna radiation pattern, Mathematical analysis.

The development of a broad-band triple-mode exciter is described in sufficient detail to enable reproduction of these and similar devices. A waveguide rotation device is described which enables accurate determinations of the peripheral electric fields to be made so that the mode contents of fields in a circular waveguide can be obtained. Experimental data on the effect of polystyrene prisms in open-ended 0.4- x 1.6-inch waveguides operating at 9,375 Mc in conjunction with reflecting disks and pointed ends are given. A mathematical theory with experimental verification is given for lossless and low-loss dielectric tube waveguides carrying axial waves. The theory of wave propagation in circular waveguides having two coaxial lossless dielectric regions is developed. An end-fire array theory of dielectric tube antennas in which the effects of finite cross-section, attenuation and standing waves are approximately taken into account is given. (See also PB 162 043-4)

PB 162 021 $12.50

Westinghouse Electric Corp., Elmira, N. Y.
AN INVESTIGATION OF GAS-FILLED THERMIONIC CONVERTERS FOR TRANSFORMING FISSION HEAT INTO ELECTRICITY, by Gene R. Feaster. Interim scientific rept. no. 1, 1 Apr-30 Sep 60, on Contract AF 33(616)7198. 15 Oct 60, 177p. 113 refs. AD-251 524.

DESCRIPTORS: Plasma physics, *Plasma oscillations, Thermonic emission, Energy, *Thermal utilization, Fission, *Electricity, *Diodes, Gases, Gas ionization, *Thermionic converters.

Attention was directed toward a survey of the state-of-the-art and experimental work on plasma diodes, with some theoretical work on plasma oscillations. In the survey no plasma diode converter was found with an actual efficiency of as much as 10%. Computer efficiency lies in the range of 10 to 15%. The survey showed that efforts are being directed toward the attainment of good efficiency at reduced cathode temperatures. Experimental work at the two Westinghouse organizations has included the following items: (1) Effect of different cathode-anode spacing, (2) Effect of gases on cell operation, (3) Effects of variations in cathode temperature, anode temperature, and cesium pressure, (4) Data were taken on plasma oscillations, (5) Performance with rubidium fill in place of cesium, (6) Moderately sophisticated test vehicles were designed, tooled for and built, and (7) A device for imaging a cesium-film-on-tungsten emitter was built and preliminary observations were made. Analysis of the possibility of using a gamma or neutron flux to provide ionization of an inert gas fill was made, with the former proving to be impractical and the latter a marginal possibility. (Author)

Molecular Physics and Spectroscopy

TID-16339 $1.10

New York U., N. Y.
THE USE OF ATOMIC BEAMS AS A PROBE FOR STUDYING LOW DENSITY PLASMAS. Quarterly rept. 1 Apr-1 July 62, on Contract AT(30-1)-2397. 31 July 62, 6p.

PB 160 912 $1.60

Texas A. and M. Coll., College Station.
VIBRATIONAL STRUCTURE OF THE ELECTRONIC SPECTRA OF SIMPLE MOLECULES. I. EVALUATION OF CONDON OVERLAP INTEGRALS FOR THE BENT XY_2 MOLECULE, by J. K. Ward and J. B. Coon. Rept. on Contract AF 18(600)439. July 54, 16p. OSR-TN-54-181; AD-38 856.

DESCRIPTORS: Molecules, *Molecular spectroscopy, Vibration, Ultraviolet spectroscopy, Absorption spectra

A method is outlined for evaluating the Condon overlap integral associated with any vibronic band of a UV absorption system of an XY_2 molecule. All necessary formulas are included. For the small vibration problem, the geometry of the molecule as well as its vibrational frequencies must be given for both of the electronic states involved. A relation between coordinates of the normal state and those of the excited state must be found in order to evaluate the Condon overlap integrals.

TID-15744 $5.60

Vanderbilt U., Nashville, Tenn.
A SPECTROSCOPIC STUDY OF SOME RELATED ACETIC COMPOUNDS, by Fred Sicilio. Master's thesis. June 53, 56p. 21 refs.

PB 160 934 $10.10

Warner and Swasey Research Corp., New York.
INFRARED EMISSION AND ABSORPTION OF CARBON DIOXIDE AT HIGH TEMPERATURES, by Richard H. Tourin. Rept. on Contract AF 18(600)596. May 54, 123p. 20 refs. Technical rept. no. 258; [OSR-TR-54-22]; AD-37 571.

PB 162 043-1 $9.10

Microwave Lab., Northwestern U., Evanston, Ill. INVESTIGATIONS OF MULTI-MODE PROPAGATION IN WAVEGUIDES AND MICROWAVE OPTICS, by R. E. Beam, W. A. Huges and others. Quarterly progress rept. no. 1, 1 May-31 July 49, on Contract W36-039-sc-38240. July 49, 103p. 10 refs. ATI-61 131.

DESCRIPTORS: *Waveguides, Propagation, Wave transmission, Dielectrics, Microwave frequency, *Microwaves, Microwave equipment, *Optics, Prisms (Optics), Tellurium, Crystal oscillators, Antennas, Design, Antenna horns, Antenna radiation patterns, Lenses, Mathematical analysis.

The purpose of this project is to conduct studies and investigations of the following: (a) Multi-mode propagation in waveguides as a transmission technique (b) Use of multi-mode propagation in waveguides as a means of multiplex operations in a single guide. (c) Multi-mode propagation as a technique for producing required illuminations over the apertures of horns (d) Principles and basic considerations in small lens optics as applied to dielectric lenses for microwaves. 'Small lens" refers particularly to those of the order of one wavelength or less in diameter. Emphasis is placed on divergent rather than convergent lenses. (e) Properties and applications of hollow dielectric pipes as a means of conducting RF energy at microwave frequencies. (Author)

PB 162 043-2 $9.60

Microwave Lab., Northwestern U., Evanston, Ill. INVESTIGATIONS OF MULTI-MODE PROPAGATION IN WAVEGUIDES AND MICROWAVE OPTICS, by R. E. Beam, W. L. Firestone and others. Quarterly progress rept. no. 2, 1 Aug-31 Oct 49, on Contract W 36-039-sc-38240. [1949] 117p. 8 refs. ATI-68 049.

DESCRIPTORS: *Waveguides, Propagation, Wave transmission, Dielectrics, Microwave frequency, *Microwaves, Microwave equipment, *Optics, Lenses, Tellurium, Thulium, Helium, Antennas, Design, Antenna horns, Antenna radiation patterns, Mathematical analysis

A progress report concerns investigations of multimode propagation in waveguides and of microwave optics. Its five principle categories comprise multimode wave guide techniques, radiation of TM_{01} and TE_{11} modes from open-ended circular waveguides, fundamental research in microwave optics, dielectric tube waveguides, and dielectric tube antennas. Design procedures, dimensions and operating characteristics of a triple-mode exciter are included. Fresnel's integrals and the Cornu spiral were adequate for solving certain diffraction problems when the field point is many wave lengths from the diffracting aperture and when the diffraction angle is small. The characteristic equation for the polytube waveguide was solved for a number of points for the second rank hybrid mode for the case of a polyrod. (See also PB 162 043-1)

PB 162 043-3 $10.50

Microwave Lab., Northwestern U., Evanston, Ill. INVESTIGATION OF MULTI-MODE PROPAGATION IN WAVEGUIDES AND MICROWAVE OPTICS, by R. E. Beam, W. L. Firestone and others. Quarterly progress rept. no. 3, 1 Nov 49-31 Jan 50, on Contract W 36-039-sc-38240. [1950] 134p. 6 refs. ATI-77 936.

DESCRIPTORS: *Waveguides, Propagation, Wave transmission, Dielectrics, Microwave frequency, *Microwaves, Microwave equipment, *Optics, Lenses, Tellurium, Antennas, Design, Antenna radiation patterns, Mathematical analysis, Phase shifters, Integrals

Progress is reported on the investigations of multimode propagation in waveguides and microwave optics. A triple mode exciter was used to simultaneously launch launch more than one mode, and the electric distribution for various mixtures of the TE_{10}, TE_{20}, and TE_{30} modes were recorded. Various methods of measuring the radial components of electric field intensity at the periphery of a circular waveguide are discussed. Fresnel's integrals and the Cornu spiral were found adequate for solving certain diffraction problems when the field point is many wave-lengths from the diffracting aperture and when the diffraction angle is small. Additions were made to the end-fire array theory of the radiation patterns of dielectric tube antenna to include the effects of attenuation and the finite cross section of the tubes. More details of the theory of dielectric tube waveguides are also given. (See also PB 162 043-2)

PB 162 043-4 $8.60

Microwave Lab., Northwestern U., Evanston, Ill. INVESTIGATIONS OF MULTI-MODE PROPAGATION IN WAVE-GUIDES IN MICROWAVE OPTICS, by R. E. Beam, W. L. Firestone, and others. Quarterly progress rept. no. 4, 1 Feb-30 Apr 50, on Contract W 36-039-sc-38240. [1950] 95p. 7 refs. ATI-81 332.

DESCRIPTORS: *Waveguides, Propagation, Wave transmission, Dielectrics, Microwave frequency, *Microwaves, Microwave equipment, *Optics, Lens antennas, Lenses, Antennas, Design, Antenna radiation patterns, Mathematical analysis.

A precision phase shifter capable of shifting phase by 250 degrees with an error of less than one percent was constructed. An approximate theory of mode conversion by dielectric slugs based on total reflection of the bouncing waves at the dielectric-air interface is given with supporting evidence. End-fire array theory of the radiation pattern of dielectric tube antennas is extended to include the effect of standing waves along the dielectric tubes. Cutoff characteristic curves for the second rank symmetrical modes and additional attenuation curves for the lowest order hybrid modes on polytube waveguides are given. (See also PB 162 043-3)

being examined carefully at present is whether the appropriate compositions of cerium sulfide compounds can be made in which the figure of merit has relatively high values at lower temperatures than what has been reported previously. (See also AD-275 127)

Theoretical Physics

PB 162 053 $2.60

Microwave Lab., Stanford U., Calif.
FIELD-THEORY ANALOGS OF THE LAGRANGE AND POINCARE INVARIANTS, by P. A. Sturrock. Rept. on Contract Nonr-22548. Feb 60, 29p. 24 refs. ML rept. no. 689; AD-235 200.

DESCRIPTORS: *Relativity theory, Quantum mechanics, Electromagnetic theory, Elasticity.

The Lagrange differential invariant and the Poincare integral invariant of Classical Dynamics have as their analogs in Lagrangian field theory a differential divergence-free vector and an integral divergence-free vector. The former, which is expressible as a divergence-free vector-bracket expression, may be used to derive conservation relations associated with the transformation properties of a given system. It is necessary that these transformations should be infinitesimal. Conservation theorems are established for systems which are periodic and for systems which are invariant under spatial inversion. The differential divergence-free vector may also be used to establish reciprocity and orthogonality relations. Examples are Betti's reciprocal theorem of elasticity and Lorentz's reciprocal relation of electromagnetic theory. An extended form of the differential divergence-free vector allows for variation not only of the dependent variables but also of the independent variables. The integral divergence-free vector associates a conserved quantity with any closed one-parameter family of solutions of the field-equations. The equation of conservation of probability of quantum mechanics, and a classical form of the relation between the momentum and wave vectors for a plane wave in a propagating medium are derived. (Author)

NYO-10236 $1.60

Rochester U., N. Y.
EXACTLY SOLVABLE CASES OF REGGE POLES FROM MADELSTAM REPRESENTATION, by R. Acharya and A. Bhattacharjie. Rept. on Contract AT(30-1)-875. 21 June 62, 13p. 11 refs.

Thermodynamics

NASA N62-14425 $1.60

California U., La Jolla.
THERMODYNAMIC DATA ON THE FORMATION OF SOLID CARBON AND ORGANIC COMPOUNDS IN PRIMITIVE PLANETARY ATMOSPHERES, by Hans E. Suess. Rept. on Grants NsG-97-60 and NsG-98-60. Jan 62, 13p. 21 refs.

GAMD-2089 $2.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
AN APPARATUS FOR MEASURING THE THERMAL CONDUCTIVITY OF GRAPHITE AT TEMPERATURES ABOVE 2000°F, by J. H. VanSant. Rept. on Contract AT(04-3)-314. 20 Mar 61, 21p. 12 refs.

PB 160 913 $2.60

Institute of Engineering Research, U. of Calif., Berkeley.
DIFFERENTIAL THERMAL ANALYSIS METHODS AND TECHNIQUES, by Joseph A. Pask and Maurice F. Warner. Technical rept. on Contract N7onr-29524. 1 Apr 53, 29p. 13 refs. Series no. 18, issue no. 5; AD-18 912.

DESCRIPTORS: *Calorimeters, *Minerals, Chemical reactions, Chemical analysis, *Clays, *Talc, Heating, Analysis.

Descriptions are given of the 3 major components of a differential thermal analyzer (DTA), a sample holder, a controlled source of heat, and a device for the measurement of the heats of reaction. The development of equipment designed for thermal reaction research is discussed. Heating rates and other factors are considered. The DTA method is used qualitatively for identification of certain minerals and for studies of reactions. Some quantitative studies have been made on the basis of weight percentages of certain minerals.

TID-15920 $13.00

Purdue U., Lafayette, Ind.
THE EFFECT OF SURFACE TENSION ON BOILING HEAT TRANSFER, by John Bernard Roll. Doctoral thesis. Aug 62, 183p. 53 refs.

DESCRIPTORS: *Carbon dioxide, Absorption, Spectrographic analysis, *Infrared spectroscopy, High temperature research.

Continuing previous work, the infrared emission and absorption of heated carbon dioxide, enclosed in a special gas cell, have been measured at temperatures from 25° to 1000° C and at pressures up to 1000 mm Hg. Spectral absorptivities and absorption coefficients were calculated from spectrum tracings of the 4.3μ fundamental band and the 2.7μ combination bands, at concentrations up to 17 cm-atm. Saturation with respect to partial pressure, temperature, and total pressure was observed over most of the spectrum. A quantitative picture was obtained of the relation between temperature and the molecular spectral energy distribution. (Author)

Solid State Physics

TID-16383 $5.60

Arizona State U., Tempe.
OPTICAL EXTINCTION BY METAL PRECIPITATES IN SEMICONDUCTORS AND INSULATORS, by B. R. Gossick. Special rept. on Contract AT(11-1)-715. July 62, 40p. 29 refs.

NAA-SR-MEMO-7172 $3.60

Atomics International, Canoga Park, Calif.
MECHANICAL PROPERTIES, THERMAL EXPANSION COMPATIBILITY AND HEAT TREATMENTS OF PbTe, by P. E. Elkins. 26 Feb 62, 31p. 2 refs.

AD-258 293 $1.10

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HIGH-TEMPERATURE BROAD-BAND SEMICONDUCTORS, by S. W. Kurnick, J. C. Appel, and M. Cutler. Quarterly technical summary rept. 1 July-30 Sep 60, on Contract NObs-77144. 4 Oct 60, 6p. 1 ref. Rept. no. GACD-1716; ARPA Order no. 81-59.

DESCRIPTORS: *Semiconductors, *Broadband, *Cerium compounds, Sulfides, Thorium compounds, *Heat transfer, Electrical conductance, Electrical properties, Preparation, Lattices, *Thermoelectricity, Measurement, Thermodynamics, Theory.

The figure of merit for Ce-S, $\gamma = \alpha^2 \sigma T/\kappa$, has been improved from 0.1 at 1650°K to as high as 0.25. Improvement in semiconductor performance has been realized by the use of material which was initially crack-free at room temperature and whose room temperature conductivity was about 600 mho cm^{-1}. A new graphite resistance furnace has been put into operation. Another metallurgical approach has been directed toward the alloying of Ce_2S_3 with "cerium-brass" (CeS) as well as with BaS. The theoretical interpretation of the change in conductivity of an insulator to a metal, such as when Ce_2S_3 becomes almost metallic in conduction in the form Ce_3S_4, is also being investigated. Apparatus particularly designed to measure the low Hall mobilities encountered in these semiconducting compounds has been constructed. (See also PB 160 983)

AD-259 034 $1.10

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HIGH-TEMPERATURE BROAD-BAND SEMICONDUCTORS, by S. W. Kurnick, M. F. Merriam, and G. L. Guthrie. Quarterly technical summary rept. 1 Oct-31 Dec 60, on Contract NObs-77144. 6 Jan 61, 10p. 5 refs. Rept. no. GACD-1921; ARPA Order no. 81-59.

DESCRIPTORS: *Semiconductors, *Broadband, Metallic compounds, *Cerium compounds, Sulfides, Analysis, Electrical properties, Magnetic properties, Temperature.

Fundamental work was continued on cerium sulfide, Ce-S, in a continuing attempt to better understand the electrical and thermal transport mechanisms in this semiconductor and others having the Th_3P_4 structure. Work was started on synthesis and evaluation of related compounds which may show promise as high temperature thermoelectric materials. Results so far indicate that qualitatively different transport mechanisms are dominant in different composition ranges. From a practical standpoint, measurements to date have yielded zT's as high as 0.33. This places Ce-S in the role of a leading high temperature thermoelectric candidate. (See also AD-258 293)

AD-278 406 $2.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HIGH-TEMPERATURE BROAD-BAND SEMICONDUCTORS, by Melvin Cutler. Quarterly technical summary rept. 1 Oct-30 Dec 61, on Contract NObs-77144. 3 Jan 61, 28p. 2 refs. Rept. no. GACD-2813; ARPA Order no. 81-59.

DESCRIPTORS: *Semiconductors, *Broadband, High temperature research, Thermoelectricity, Rare earth compounds, *Cerium compounds, Sulfides, Barium compounds, *Crystal structure, Chemical impurities, Electrons, Density, Electrical conductance, Hall effect, Metallurgy, Physical chemistry, Mathematical analysis.

A number of attempts have been made to prepare refractory, rare-earth, p-type semiconductors. Studies have been continued on n-type cerium sulfide compounds with emphasis on accurate characterization of these materials in order to obtain quantitative descriptions of the transport properties. Effective techniques have been developed for determining the electron concentration in cerium sulfide samples by means of accurate density measurements in conjunction with the knowledge of the lattice constant. One of the questions

Bessel functions. The properties of this solution are discussed in some detail, and the solution is tabulated for various values of the parameters. (Author)

Documentation

PB 160 935 $9.10

Advanced Information Systems Co., Los Angeles, Calif.
THE ORGANIZATION OF LARGE FILES WITH SELF-ORGANIZING CAPABILITY. Interim rept. [1962] 107p. 96 refs.

DESCRIPTORS: *Documentation, Classification, Storage, Indexes, *File cards, *Information retrieval, Operations research, Algebras, Psychology, Pattern recognition, Computers, Computer logic, Memory devices

The program has been concerned with essentially five separate areas of investigation. The first has been concerned with the definition of the concept of a file item and how to represent it, together with the investigation of measures of the relevancy or degree of closeness of file items. The second has been concerned with the definition of file organization based on both this measure of closeness and the file activity. The third area of investigation has been concerned with the strategy of searching a file of this character. The fourth area of investigation has been the definition of a self-organizing process which can be imposed on a file of the given structure in such a way as to be responsive to changes in the file usage. The fifth area of investigation has been into the relevant psychological literature to show in what way this relates to the type of model developed in the other areas of investigation.

PB 160 936 $3.60

Little, Arthur D., Inc., Cambridge, Mass.
LINEAR ASSOCIATIVE INFORMATION RETRIEVAL, by Vincent E. Giuliano and Paul E. Jones. 13 Aug 62, 38p. 7 refs. Working memo. Acorn-O.

DESCRIPTORS: *Information retrieval, Transformations (Mathematics), Documentation.

This paper is concerned with the recognition and exploitation of term associations for the retrieval of documents. A general theory of association and associative retrieval is presented; it is based on the use of linear transformations, both for establishing associations among terms and for discriminating among documents. The design and behavior of a simple experimental device which realizes the theory is discussed. (Author)

PB 160 938 $2.60

Pennsylvania U. [Philadelphia].
THE TRANSFORMATIONAL STATUS OF THE DEFINITE ARTICLE IN ENGLISH (CONTINUED), by Beverly Robbins. Rept. no. 38 on Transformations and Discourse Analysis Projects. Jan 62, 25p. 16 refs.

DESCRIPTORS: *English language, Language, Transformations.

Nominalized sentences as right adjuncts of the N
The principal structures
Noun clauses as modifiers
Transformationally derived N_f
Some properties of the N_f that S_2
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Nominalizations of adjectives followed by an adverbial clause
Infinitive wh- clauses
Descriptions of the form the N_e of N's V ing +
An epilogue: appositive nouns and the definite article

SCTM-123-62(73) $1.60

Sandia Corp., Albuquerque, N. Mex.
ABSTRACTING, STORING, AND RETRIEVING ENVIRONMENTAL ENGINEERING INFORMATION, by R. S. Hooper. June 62, 19p. 8 refs.

PB 160 937 $15.00

Thompson, John I., and Co., Washington, D. C.
FEDERAL GOVERNMENT'S SYSTEM FOR DISTRIBUTING ITS UNCLASSIFIED R&D REPORTS, by T. R. O'Donnell, J. L. Lewis, and J. I. Glendinning. Rept. on National Science Foundation Contract NSF C-224, 20 June 62, 225p.

DESCRIPTORS: Operations research, *Scientific reports, Distribution, Costs, Time, *Federal government.

The conduct of the study involved a field investigation of 31 representative Government information activities; an operations research appraisal of information distribution systems, including the development of an analytical model for effective dissemination; an analysis of currently-produced technical information; and research involving environmental factors affecting the distribution process.

MISCELLANEOUS

PB 181 077 $1.25, $10.00/year

Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS. Oct 62.

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

PB 160 941 $1.60

Material Lab., New York Naval Shipyard, Brooklyn.
THE JET-ARC IMAGE FURNACE AS A HIGH-TEMPERATURE RESEARCH TOOL, by J. A. Carter, J. Dennis and others. Feb 61, 14p. 14 refs.

DESCRIPTORS: *Laboratory equipment, *Electric furnaces, *Electric arcs, Carbon arc lamps, Refractory materials, Tests, High temperature research.

The objective of this paper is the presentation of information pertaining to carbon-arc imaging furnaces, in particular the jet-arc double-ellipsoid furnace, its operating characteristics, irradiances, obtainable image sizes and the flux distributions over their faces, sample temperatures attainable, the results of investigations which have been carried out employing this unit, and the types of measurements which can be made with the unit. (Author)

Order from GPO $0.20 as C 21.2:In3/3

Patent Office, Washington, D. C.
HOW TO OBTAIN INFORMATION FROM UNITED STATES PATENTS. [1962] 22p.

DESCRIPTORS: *Patents, Documentation, Periodicals, Microfilm, Libraries, Scientific research, Information retrieval.

A person who is interested in any field of technology may obtain extremely valuable information by keeping informed of developments disclosed in current United States patents. A review of older patents will also provide useful knowledge and some stimulation to the interested researcher. This pamphlet explains the use of these information sources so that they may be more effectively and widely used.

AD-276 688 $3.60

Stanford Electronics Labs., Stanford U., Calif.
COMMUNICATION PROCESSES IN RANDOM MULTIPATH CHANNELS, by C. K. Rushforth. Rept. on Contract Nonr-225(24). Apr 62, 37p. 11 refs. Technical rept. no. 2004-5; SEL-62-063.

DESCRIPTORS: *Multipath transmission, *Communications theory, Correlation technique, Memory devices, Probability, Noise, Mathematical analysis, Integral transformations, Matrix algebra

This report considers some of the problems associated with communications through channels whose exact nature is not known a priori. Two criteria for evaluating system performance are discussed: the probability of error and the divergence between statistical hypotheses. For a particular case of random multipath channel communication, an expression is obtained for the probability of error as a monotonically decreasing function of the divergence. This expression is shown to be identical to an expression obtained for the case of receiving known signals in the presence of additive noise. The adaptive behavior of a receiver with memory making a sequence of observations is considered. It is shown for a particular case that the optimum receiver evolves from one using estimates of the channel output to the classical matched filter or correlation detector using a known channel output. (Author)

SOCIAL SCIENCES

OTS SB-501 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
CIVIL DEFENSE. July 62, 11p. 168 refs. OTS Selective Bibliography SB-501.

DESCRIPTORS: *Civilian defense systems, *Bibliography, Shelters, Radioactive fall-out, Air raid shelters, Materials, Resistance, Shielding, Costs, Specifications, Radiation effects, Blast, Radiobiology, Underground structures, Hospitals, Safety, Radiological warfare, Biological warfare, Chemical warfare, Hazards, Weapons, Public health, *National defense.

Lists 168 reports and translations added to the OTS collection through July 1962. Covers research on fallout shelters and other types of protective shelters, air raid protection, shelter materials to resist bombing, shielding, radioactive fallout, cost and specifications for fallout shelters, evaluation of radiation protection blast biology, underground hospitals, safety measures, atomic warfare, biological warfare, chemical warfare, hazards, weapons, and health physics. (Author)

PB 160 927 $4.60

[Office of Research Administration] U. of Michigan, Ann Arbor.
THE TIME DEPENDENT WAITING LINE PROBLEM, by A. Bruce Clark. Rept. on Contract N6onr-232, T. O. 1, Mar 53, 42p. 10 refs. Rept. no. M720-1 R 39; AD-8072.

DESCRIPTORS: Management engineering, *Operations research, *Probability, Partial differential equations, Solutions.

The waiting line problem, in which the input and service time distributions have independent Poisson distributions with time dependent parameters, is studied for the single server case. An explicit solution for the line length probabilities, as functions of time, is sought by reducing the problem to the solution of a hyperbolic partial differential equation for a modified characteristic function of the distribution. The solution of this equation is shown to depend on a certain Volterra type integral equation, which can be solved numerically in general. In the case where the Poisson parameters of the input and service time distributions are proportional, this equation can be solved explicitly, and gives a solution for our problem in terms of modified

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DESCRIPTORS: *Naval research, *Scientific research, Radiation instruments, Thermal conductivity, Transducers, Atmosphere, Astrophysics, Oxygen, Light transmission, Photometers, Chemistry, Spaceships, Submarines, Mechanics, Fracture (Mechanics) Shock, Deformation, Metallurgy, Ceramic materials, Steel, Niobium, Iron, Nickel, Neutrons, Dosimeters, Corrosion, Nuclear physics, Resonance, Scattering, Radio, Guided missiles, Radar ranging, Complex variables, Telemeter systems, Radiofrequency, Plasma physics, Solid state physics, Molybdenum, Superconductivity, Sound, Electronic equipment, Pressure, Temperature, Scientific reports, Patents

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Experienced personnel will gladly assist in the solution of specific problems, explain the scope and meaning of regulations administered by the Department, and provide practical assistance in the broad field of domestic and foreign commerce. Field offices act as official sales agents of the Superintendent of Documents, and maintain an extensive business reference library containing periodicals, directories, publications and reports from official as well as private sources.

Among the many services which businessmen have found of value are:

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- Establishing a new business

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- Census data, with national and often State and regional breakdowns, on manufacturing, wholesaling, retailing, service industries, employment and unemployment, population, housing, agriculture
- Basic records of national income and product, regional trends, balance of payments, foreign aid

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- Development and maintenance of markets
- Distribution channels, facilities and services
- Marketing and distribution statistics

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- Modernization of plant processes and other technological aids
- Development of new products
- Government-owned patents for free license
- Commodity standards

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- Import and export quotas, licensing regulations
- Statistics on imports and exports
- Investment and trade opportunities abroad
- Economic conditions in foreign countries

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To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

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